

Fundamentals of Mathematics 3

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Book 3 Final Review

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To the Learner

Welcome to *Fundamentals of Mathematics 3*.

You have the skills you need to be a strong student in this class. Your instructor knows this because you have passed the Fundamentals of Mathematics 2 class, or you have been assessed into this level.

Adult math learners have many skills. They have a lot of life experience. They also use math in their everyday lives. This means that adult math learners may already know some of what is being taught in this book. Use what you already know with confidence!

How to Use This Book

This textbook has:

A **Table of Contents** listing the units, the major topics, and the subtopics.

Many **Exercises** to practice what you learned. You do not have to do every single question!

- Do as many questions as you feel are necessary for you to be confident in your skill. It is best to do all the word problems.
- If you leave out some questions, try doing every second or every third question. Always do some questions from the end of each exercise because the questions usually get harder at the end. You might use the skipped questions for review before a test.
- If you are working on a difficult skill or concept, do half the exercise one day and finish the exercise the next day. That is a much better way to learn.

Self-tests at the end of most topics have an “Aim” at the top. If you do not meet the aim, talk to your instructor, find what is causing the trouble, and do some more review before you go on.

Mark /18 Aim 15/18

A **Review and Extra Practice** section is at the end of each unit. If there is an area of the unit that you need extra practice in, you can use this. Or, if you want, you can use the section for more review.

A **Practice Test** is available for each unit. You may:

- Write the practice test after you have studied the unit as a practice for the end-of-chapter test, OR
- You might want to write it before you start the unit to find what you already know and which areas you need to work on.

Unit Tests are written after each unit. Again, you must reach the Aim before you begin the next unit. If you do not reach the aim, the instructor will assist you in finding and practising the difficult areas. When you are ready, you can write a Test B to show that you have mastered the skills.

A **Final Test** is to be written when you have finished the book. This final test will assess your skills from the whole book. You have mastered the skills in each unit and then kept using many of them throughout the course. The test reviews all those skills.

How to Deal with Math Anxiety

Emotions and Learning

Our feelings have a big effect on how we learn. When we're calm and relaxed, we learn better. But when we're scared or stressed, it's harder for us to learn.

Many people are afraid of math. "Math anxiety" is the fear of math. People who suffer from math anxiety may get headaches, sick stomachs, cold hands, or they may just sweat a lot or just feel scared. Math anxiety can happen for a few different reasons:

- Feeling anxious when writing tests
- Negative experiences in a past math class
- Social pressures and expectations to not like math or not do well in math
- The want to get everything right
- Negative self-messages ("I don't know how to do it," or "I hate math")

Math anxiety is a learned habit. If it is learned, it can be unlearned. Everyone can learn math. There are some people who are better at math than others, but even these people had to learn to be good at math.

Do You Suffer from Math Anxiety?

Read the list below and put a check mark beside the ones you feel when thinking about or doing math.

- Are your palms moist?
- Is your stomach fluttering?
- Do you feel like you can't think clearly?

- Do you feel like you would rather do anything else than learn math?
- Are you breathing faster than normal?
- Is your heart pounding?
- Do you feel cold?
- Do you feel sweaty?

If you answered yes to two or more of these items, you may have math anxiety.

Strategies for Managing Math Anxiety

The key to learning is to be the “boss” of your anxiety. Here are some strategies that may help deal with your anxiety.

Use Breathing Exercises

One way to be the “boss” is to relax. Try this breathing exercise.

Start by breathing slowly to the count of four. It may help to close your eyes and count. Now hold your breath for four counts and then let your breath out slowly to the count of four.

The counting is silent and should follow this pattern: “Breath in, two, three, four. Hold, two, three, four. Breath out, two, three, four. Wait, two, three, four.”

With practice, the number of counts can be increased. This is an easy and good way to relax.

Now, try this exercise quietly and repeat it five times slowly.

Each time you feel anxious about learning, use the breathing exercise to help calm yourself.

Think Positive Math Messages

Another way to be the “boss” is to give yourself positive math messages. Read and think about the positive math messages listed below.

I like math.
I am good at math.
I understand math.
I can relax when I am studying math.
I am capable of learning math.
My math improves every day.
I am relaxed, calm and confident when I study math.
I understand math when I give myself a chance.
Math is creative.

Pick three statements that you like and say them to yourself as much as you can in each day. You can also write the statements out on paper and post them around your house so that you read them throughout the day.

Know Your Textbook

Look at the Table of Contents in the front of your textbook. It tells you what you will be learning. You may see some things that you already know, some things that you may have forgotten, and some things that are new to you.

Flip the pages. You can see that the textbook is split into units. Each unit is something to learn.

Each unit has exercises to do. Notice the answers at the end of each exercise. You can check your answers as soon as you are done. You can also check your answer before moving on if are not sure if you are doing a question right.

At the end of each unit is a self-test. It is a chance for you to see how well you have learned the skills in the unit. If you do well, you can move on. If you don't do well, you can go back and practice those skills.

Knowing your textbook gives you a good skill. If you get frustrated, you can use the Table of Contents to go back and find some help.

Understand Test-Taking Anxiety

Here are four reasons people may be anxious when writing tests, along with strategies for coping:

1. Not feeling prepared for the test

Many students feel anxiety about taking math tests because they do not feel prepared for the test. To feel prepared, a student needs to have studied the work and know that they can do the problems they will be given.

Getting ready for a test starts on the first day of class. Everything you do in class and at home is part of that getting ready.

- **Always do as many exercises as you need to help you understand.** Once you understand, do ten more questions, then you will know for sure that you really understand.
- **Always correct your exercises.** It is good to know that you are understanding and getting the questions right. It is also good to know if you are not understanding and need some help.
- **Always do the self-tests.** The self-tests can show things that you are not sure of.
- **Always do the review.** Review is part of this book. It is a chance to go over all the things you have learned in a unit before moving on. It prepares you for what will be on the test.
- **Always do a practice test.** A practice test gives you a chance to see how many questions and what kind of questions are on the test.

2. Not sure how to write the test in the best way

Here are some strategies students should know about how to write a test to do as well as possible:

Before the Test

- **Arrive early.** Get out all the supplies you need to do the test (pencils, ruler, calculator, watch, etc.).
- **Be comfortable, but alert.** Choose a good spot in the room, and make sure you have enough space to work. Maintain a comfortable posture in your seat, but don't "slouch."
- **Stay relaxed and confident.** Keep a good attitude. If you find yourself anxious, take several slow, deep breaths to relax.

During the test

- **Look over the test.** Take a look at the whole test before starting. This takes very little time. Use a highlighter to highlight the questions that you know you can do easily, note key terms, mark the test with comments that come to mind. As you work, put a star beside any questions that you would like to go over again when you finish the test.
- **Relax.** Before starting the test, imagine yourself somewhere where you are calm and confident. Go there in your mind. Focus on how good you feel and how in control you are. If you become anxious during the test, in your mind go to the calming place. Focus on how calm you feel. Then go back to your test.
- **Read the directions carefully.** This may be obvious, but it will help you avoid careless errors.
- **Answer questions in a strategic order.** Answer the easy questions first. This will help to build confidence and score points. It may also help you make connections with more difficult questions. Then answer the difficult questions. Work on these harder questions with all the energy of the easier ones.
- **Review your answers.** Resist the urge to hand in your test as soon as you are

done writing. Spend as much time as you can going over your test to see if you answered all the questions and check for errors.

3. Feeling too much mental pressure

There are many reasons why a student may feel mental pressure when writing a test. Listed below are a few main reasons:

- Negative beliefs about one's math abilities
- Low self-esteem when it comes to math
- Too high expectations of success
- Fear that failure or low grades will affect the future
- Feelings of pressure of not wanting to let down family members

When students feel this kind of pressure, it is very hard to feel calm and relaxed about a test. The key to success in a math test is to keep the anxiety at a manageable level. You can do this in two ways:

Change negative self-talk. Any time a negative thought creeps into your head, it will make it harder to stay positive and relaxed about your test. If you have a negative thought like “I can't do it”, try to replace it with a positive thought like “I can do this”.

Use relaxing and calming techniques. Use the calming breathing mentioned earlier in this section. This will help you keep calm. Also, do not study in the last half hour before the test. You will be calmer by spending time relaxing and breathing deeply in that last half hour.

4. Poor health habits before writing a test

When your body and mind are healthy, you will have a better chance of doing well on a test. Eat well, drink plenty of water and get daily exercise. The better you feel, the better you will do.

Unit 1: Multiplication

Topic A: Multiplying Larger Numbers

It is usually easier to multiply larger numbers if they are written underneath each other. The bottom number is called the multiplier.

To find the product of a one digit multiplier, use as many of these steps as you need to complete each multiplication question:

- **Step 1:** Multiply the ones digit in the large number by the one-digit multiplier.
- **Step 2:** Multiply the tens digit in the large number by the multiplier.
- **Step 3:** Multiply the hundreds digit in the large number by the multiplier.
- **Step 4:** Multiply the thousands digit in the large number by the multiplier.

Example A

$$62 \times 4 =$$

Step 1: 4×2 ones = 8

$$\begin{array}{r} 62 \\ \times 4 \\ \hline 8 \end{array}$$

Step 2: 4×6 tens = 24 tens = 2 hundreds and 4 tens

$$\begin{array}{r} 62 \\ \times 4 \\ \hline 248 \end{array}$$

The product of 62×4 is 248.

Exercise 1

Find the product. Check your work using the answer key at the end of the exercise.

a.
$$\begin{array}{r} 72 \\ \times 2 \\ \hline \end{array}$$

f.
$$\begin{array}{r} 71 \\ \times 3 \\ \hline \end{array}$$

k.
$$\begin{array}{r} 92 \\ \times 4 \\ \hline \end{array}$$

b.
$$\begin{array}{r} 81 \\ \times 5 \\ \hline \end{array}$$

g.
$$\begin{array}{r} 40 \\ \times 7 \\ \hline \end{array}$$

l.
$$\begin{array}{r} 83 \\ \times 3 \\ \hline \end{array}$$

c.
$$\begin{array}{r} 21 \\ \times 8 \\ \hline \end{array}$$

h.
$$\begin{array}{r} 90 \\ \times 9 \\ \hline \end{array}$$

m.
$$\begin{array}{r} 90 \\ \times 8 \\ \hline \end{array}$$

d.
$$\begin{array}{r} 80 \\ \times 6 \\ \hline \end{array}$$

i.
$$\begin{array}{r} 82 \\ \times 4 \\ \hline \end{array}$$

n.
$$\begin{array}{r} 71 \\ \times 9 \\ \hline \end{array}$$

e.
$$\begin{array}{r} 73 \\ \times 3 \\ \hline \end{array}$$

j.
$$\begin{array}{r} 40 \\ \times 5 \\ \hline \end{array}$$

o.
$$\begin{array}{r} 53 \\ \times 2 \\ \hline \end{array}$$

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$$\begin{array}{r} 30 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 70 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 60 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 81 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 41 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 92 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 61 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 90 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 81 \\ \times 4 \\ \hline \end{array}$$

Answers to Exercise 1

a. 144

b. 405

c. 168

d. 480

e. 219

f. 213

g. 280

h. 810

i. 328

j. 200

k. 368

l. 249

m. 720

n. 639

o. 106

p. 180

q. 567

r. 122

s. 560

t. 246

u. 450

v. 540

w. 276

x. 324

Example B

$$523 \times 3 =$$

$$\begin{array}{r} 523 \\ \times \quad 3 \\ \hline 1569 \end{array}$$

Step 1: 3×3 ones = 9 ones

Step 2: 3×2 tens = 6 tens

Step 3: 3×5 hundreds = 15 hundreds = 1 thousand and 5 hundreds

The product of 523×3 is 1 569.

Example C

$$901 \times 8 =$$

$$\begin{array}{r} 901 \\ \times \quad 8 \\ \hline 7208 \end{array}$$

Step 1: 8×1 one = 8 ones

Step 2: 8×0 tens = 0 tens

Step 3: 8×9 hundreds = 72 hundreds = 7 thousands and 2 hundreds

The product of 901×8 is 7 208.

Exercise 2

Find the product. Check your work using the answer key at the end of the exercise.

a.
$$\begin{array}{r} 601 \\ \times 7 \\ \hline \end{array}$$

f.
$$\begin{array}{r} 211 \\ \times 5 \\ \hline \end{array}$$

k.
$$\begin{array}{r} 901 \\ \times 6 \\ \hline \end{array}$$

b.
$$\begin{array}{r} 423 \\ \times 3 \\ \hline \end{array}$$

g.
$$\begin{array}{r} 803 \\ \times 2 \\ \hline \end{array}$$

l.
$$\begin{array}{r} 711 \\ \times 8 \\ \hline \end{array}$$

c.
$$\begin{array}{r} 641 \\ \times 2 \\ \hline \end{array}$$

h.
$$\begin{array}{r} 542 \\ \times 2 \\ \hline \end{array}$$

m.
$$\begin{array}{r} 720 \\ \times 3 \\ \hline \end{array}$$

d.
$$\begin{array}{r} 922 \\ \times 4 \\ \hline \end{array}$$

i.
$$\begin{array}{r} 813 \\ \times 3 \\ \hline \end{array}$$

n.
$$\begin{array}{r} 910 \\ \times 5 \\ \hline \end{array}$$

e.
$$\begin{array}{r} 820 \\ \times 4 \\ \hline \end{array}$$

j.
$$\begin{array}{r} 610 \\ \times 4 \\ \hline \end{array}$$

o.
$$\begin{array}{r} 801 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 932 \\ \times \quad 3 \\ \hline \end{array}$$

$$\begin{array}{r} 521 \\ \times \quad 2 \\ \hline \end{array}$$

$$\begin{array}{r} 942 \\ \times \quad 2 \\ \hline \end{array}$$

$$\begin{array}{r} 731 \\ \times \quad 2 \\ \hline \end{array}$$

$$\begin{array}{r} 632 \\ \times \quad 3 \\ \hline \end{array}$$

$$\begin{array}{r} 710 \\ \times \quad 9 \\ \hline \end{array}$$

$$\begin{array}{r} 701 \\ \times \quad 5 \\ \hline \end{array}$$

$$\begin{array}{r} 720 \\ \times \quad 4 \\ \hline \end{array}$$

$$\begin{array}{r} 601 \\ \times \quad 8 \\ \hline \end{array}$$

Answers to Exercise 2

a. 4 207

b. 1 269

c. 1 282

d. 3 688

e. 3 280

f. 1 055

g. 1 606

h. 1 084

i. 2 439

j. 2 440

k. 5 406

l. 5 688

m. 2 160

n. 4 550

o. 4 806

p. 2 796

q. 1 462

r. 3 505

s. 1 042

t. 1 896

u. 2 880

v. 1 884

w. 6 390

x. 4 808

Renaming and Carrying

In the times tables, the products are often two digit numbers. You must rename and carry. The amount you carry is added onto the product of the next column.

Example D

$$\begin{array}{r} 68 \\ \times 7 \\ \hline \end{array}$$

Step 1: Multiply the ones by the multiplier.

$$7 \times 8 \text{ ones} = 56 \text{ ones} = 5 \text{ tens} + 6 \text{ ones}$$

Write the 6 ones in the product.

Carry the 5 tens to the tens column and make a note of it for yourself. You might write it above the tens column.

$$\begin{array}{r} 5 \\ 68 \\ \times 7 \\ \hline 6 \end{array}$$

Step 2: Multiply the tens by the multiplier.

$$7 \times 6 \text{ tens} = 42 \text{ tens}$$

Now add on the 5 tens that you carried.

$$42 \text{ tens} + 5 \text{ tens} = 47 \text{ tens} = 4 \text{ hundreds and } 7 \text{ tens}$$

$$\begin{array}{r} 5 \\ 68 \\ \times 7 \\ \hline 476 \end{array}$$

Exercise 3

Find the product. Check your work using the answer key at the end of the exercise.

a.
$$\begin{array}{r} 16 \\ \times 8 \\ \hline \end{array}$$

f.
$$\begin{array}{r} 92 \\ \times 9 \\ \hline \end{array}$$

k.
$$\begin{array}{r} 58 \\ \times 8 \\ \hline \end{array}$$

b.
$$\begin{array}{r} 62 \\ \times 6 \\ \hline \end{array}$$

g.
$$\begin{array}{r} 48 \\ \times 6 \\ \hline \end{array}$$

l.
$$\begin{array}{r} 45 \\ \times 4 \\ \hline \end{array}$$

c.
$$\begin{array}{r} 37 \\ \times 4 \\ \hline \end{array}$$

h.
$$\begin{array}{r} 17 \\ \times 2 \\ \hline \end{array}$$

m.
$$\begin{array}{r} 56 \\ \times 3 \\ \hline \end{array}$$

d.
$$\begin{array}{r} 14 \\ \times 9 \\ \hline \end{array}$$

i.
$$\begin{array}{r} 26 \\ \times 4 \\ \hline \end{array}$$

n.
$$\begin{array}{r} 47 \\ \times 5 \\ \hline \end{array}$$

e.
$$\begin{array}{r} 36 \\ \times 7 \\ \hline \end{array}$$

j.
$$\begin{array}{r} 54 \\ \times 7 \\ \hline \end{array}$$

o.
$$\begin{array}{r} 39 \\ \times 6 \\ \hline \end{array}$$

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$$\begin{array}{r} 75 \\ p. 6 \\ \hline \end{array}$$

$$\begin{array}{r} 98 \\ s. 3 \\ \hline \end{array}$$

$$\begin{array}{r} 74 \\ v. 8 \\ \hline \end{array}$$

$$\begin{array}{r} 38 \\ q. 5 \\ \hline \end{array}$$

$$\begin{array}{r} 29 \\ t. 5 \\ \hline \end{array}$$

$$\begin{array}{r} 56 \\ w. 5 \\ \hline \end{array}$$

$$\begin{array}{r} 82 \\ r. 7 \\ \hline \end{array}$$

$$\begin{array}{r} 47 \\ u. 3 \\ \hline \end{array}$$

$$\begin{array}{r} 98 \\ x. 4 \\ \hline \end{array}$$

Answers to Exercise 3

a. 128

b. 372

c. 148

d. 126

e. 252

f. 828

g. 288

h. 34

i. 104

j. 378

k. 464

l. 180

m. 168

n. 235

o. 234

p. 450

q. 190

r. 574

s. 294

t. 145

u. 141

v. 592

w. 280

x. 392

Example E

$$4 \times 224 =$$

$$\begin{array}{r} 224 \\ \times 4 \\ \hline \end{array}$$

Step 1: 4×4 ones = 16 ones = 1 ten and 6 ones

Write the 6 ones in the product and carry the one ten.

$$\begin{array}{r} 1 \\ 224 \\ \times 4 \\ \hline 6 \end{array}$$

Step 2: 4×2 tens = 8 tens

8 tens + 1 ten we carried = 9 tens

$$\begin{array}{r} 1 \\ 224 \\ \times 4 \\ \hline 96 \end{array}$$

Step 3: 4×2 hundreds = 8 hundreds

$$\begin{array}{r} 1 \\ 224 \\ \times 4 \\ \hline 896 \end{array}$$

Example F

$$4 \times 456 =$$

$$\begin{array}{r} 456 \\ \times \quad 5 \\ \hline \end{array}$$

Step 1: 5×6 ones = 30 ones = 3 ten and 0 ones

The 0 must be written to hold the ones place. Carry the 3 tens.

$$\begin{array}{r} \\ 456 \\ \times \quad 5 \\ \hline 0 \end{array}$$

Step 2: 5×5 tens = 25 tens

25 tens + 3 tens = 28 tens = 2 hundreds and 8 tens

Write the 8 tens in the product. Carry the 2 hundreds.

$$\begin{array}{r} \\ 456 \\ \times \quad 5 \\ \hline 80 \end{array}$$

Step 3: 5×4 hundreds = 20 hundreds + 2 hundreds = 22 hundreds = 2 thousands and 2 hundreds

$$\begin{array}{r} \\ 456 \\ \times \quad 5 \\ \hline 2280 \end{array}$$

Exercise 4

Find the products. Check your work using the answer key at the end of the exercise.

a.
$$\begin{array}{r} 648 \\ \times \quad 9 \\ \hline \end{array}$$

f.
$$\begin{array}{r} 156 \\ \times \quad 4 \\ \hline \end{array}$$

k.
$$\begin{array}{r} 139 \\ \times \quad 8 \\ \hline \end{array}$$

b.
$$\begin{array}{r} 240 \\ \times \quad 7 \\ \hline \end{array}$$

g.
$$\begin{array}{r} 407 \\ \times \quad 8 \\ \hline \end{array}$$

l.
$$\begin{array}{r} 565 \\ \times \quad 2 \\ \hline \end{array}$$

c.
$$\begin{array}{r} 457 \\ \times \quad 8 \\ \hline \end{array}$$

h.
$$\begin{array}{r} 239 \\ \times \quad 6 \\ \hline \end{array}$$

m.
$$\begin{array}{r} 248 \\ \times \quad 3 \\ \hline \end{array}$$

d.
$$\begin{array}{r} 404 \\ \times \quad 2 \\ \hline \end{array}$$

i.
$$\begin{array}{r} 118 \\ \times \quad 9 \\ \hline \end{array}$$

n.
$$\begin{array}{r} 604 \\ \times \quad 6 \\ \hline \end{array}$$

e.
$$\begin{array}{r} 106 \\ \times \quad 9 \\ \hline \end{array}$$

j.
$$\begin{array}{r} 425 \\ \times \quad 7 \\ \hline \end{array}$$

o.
$$\begin{array}{r} 239 \\ \times \quad 4 \\ \hline \end{array}$$

$$\begin{array}{r} 576 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 674 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 583 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 857 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 629 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 952 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 478 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 893 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 293 \\ \times 7 \\ \hline \end{array}$$

Answers to Exercise 4

- a. 5 832
- b. 1 680
- c. 3 656
- d. 808
- e. 954
- f. 624
- g. 3 256
- h. 1 434

- i. 1 062
- j. 2 975
- k. 1 112
- l. 1 130
- m. 744
- n. 3 624
- o. 956
- p. 1 728

- q. 5 142
- r. 4 302
- s. 4 718
- t. 5 032
- u. 4 465
- v. 4 664
- w. 8 568
- x. 2 051

Example G

$$\begin{array}{r} 2408 \\ \times \quad 9 \\ \hline \end{array}$$

$$\begin{array}{r} 37 \\ 2408 \\ \times \quad 9 \\ \hline 21672 \end{array}$$

Step 1: 9×8 ones = 72 ones = 7 tens and 2 ones

Step 2: $9 \times 0 = 0$ tens. 0 tens + 7 tens = 7 tens

Step 3: 9×4 hundreds = 36 hundreds = 3 thousands and 6 hundreds

Step 4: 9×2 thousands = 18 thousands. 18 thousands + 3 thousands = 21 thousands

Exercise 5

Find the products. Check your work using the answer key at the end of the exercise.

a.
$$\begin{array}{r} 4103 \\ \times \quad 8 \\ \hline \end{array}$$

c.
$$\begin{array}{r} 3280 \\ \times \quad 6 \\ \hline \end{array}$$

e.
$$\begin{array}{r} 8456 \\ \times \quad 2 \\ \hline \end{array}$$

b.
$$\begin{array}{r} 6087 \\ \times \quad 4 \\ \hline \end{array}$$

d.
$$\begin{array}{r} 7034 \\ \times \quad 5 \\ \hline \end{array}$$

f.
$$\begin{array}{r} 4758 \\ \times \quad 7 \\ \hline \end{array}$$

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$$\begin{array}{r} 4735 \\ \times \quad 3 \\ \hline \end{array}$$

$$\begin{array}{r} 4187 \\ \times \quad 6 \\ \hline \end{array}$$

$$\begin{array}{r} 4256 \\ \times \quad 7 \\ \hline \end{array}$$

$$\begin{array}{r} 5402 \\ \times \quad 9 \\ \hline \end{array}$$

$$\begin{array}{r} 1376 \\ \times \quad 9 \\ \hline \end{array}$$

$$\begin{array}{r} 5491 \\ \times \quad 5 \\ \hline \end{array}$$

$$\begin{array}{r} 5394 \\ \times \quad 4 \\ \hline \end{array}$$

$$\begin{array}{r} 3297 \\ \times \quad 2 \\ \hline \end{array}$$

$$\begin{array}{r} 8032 \\ \times \quad 9 \\ \hline \end{array}$$

$$\begin{array}{r} 2034 \\ \times \quad 8 \\ \hline \end{array}$$

$$\begin{array}{r} 9628 \\ \times \quad 3 \\ \hline \end{array}$$

$$\begin{array}{r} 8645 \\ \times \quad 6 \\ \hline \end{array}$$

$$\begin{array}{r} 8652 \\ \times \quad 5 \\ \hline \end{array}$$

$$\begin{array}{r} 7689 \\ \times \quad 8 \\ \hline \end{array}$$

$$\begin{array}{r} 6453 \\ \times \quad 2 \\ \hline \end{array}$$

$$\begin{array}{r} 6392 \\ \times \quad 7 \\ \hline \end{array}$$

$$\begin{array}{r} 5160 \\ \times \quad 3 \\ \hline \end{array}$$

$$\begin{array}{r} 8129 \\ \times \quad 4 \\ \hline \end{array}$$

Answers to Exercise 5

a. 32 824

b. 24 348

c. 19 680

d. 35 170

e. 16 912

f. 33 306

g. 14 205

h. 48 618

i. 21 576

j. 16 272

k. 43 260

l. 44 744

m. 25 122

n. 12 384

o. 6 594

p. 28 884

q. 61 512

r. 15 480

s. 29 792

t. 27 455

u. 72 288

v. 51 870

w. 12 906

x. 32 516

Topic A: Self-Test**Mark /14 Aim 11/14**

A. Find the products. (6 marks)

a.
$$\begin{array}{r} 62 \\ \times 4 \\ \hline \end{array}$$

c.
$$\begin{array}{r} 423 \\ \times 3 \\ \hline \end{array}$$

e.
$$\begin{array}{r} 8342 \\ \times 2 \\ \hline \end{array}$$

b.
$$\begin{array}{r} 31 \\ \times 4 \\ \hline \end{array}$$

d.
$$\begin{array}{r} 734 \\ \times 2 \\ \hline \end{array}$$

f.
$$\begin{array}{r} 5231 \\ \times 3 \\ \hline \end{array}$$

B. Multiply these numbers. (4 marks)

a.
$$\begin{array}{r} 44 \\ \times 7 \\ \hline \end{array}$$

c.
$$\begin{array}{r} 207 \\ \times 9 \\ \hline \end{array}$$

b.
$$\begin{array}{r} 69 \\ \times 8 \\ \hline \end{array}$$

d.
$$\begin{array}{r} 184 \\ \times 6 \\ \hline \end{array}$$

C. Find the products. (4 marks)

$$\begin{array}{r} 2834 \\ \times \quad 5 \\ \hline \end{array}$$

$$\begin{array}{r} 9241 \\ \times \quad 8 \\ \hline \end{array}$$

$$\begin{array}{r} 4037 \\ \times \quad 6 \\ \hline \end{array}$$

$$\begin{array}{r} 3652 \\ \times \quad 4 \\ \hline \end{array}$$

Answers to Topic A Self-Test

A. Find the products.

a. 248

d. 1 468

b. 124

e. 16 684

c. 1 269

f. 15 693

B. Multiply these numbers.

a. 308

c. 1 863

b. 552

d. 1 104

C. Find the products.

a. 14 170

c. 73 928

b. 24 222

d. 14 608

Topic B: Two- and Three-Digit Multipliers

When the multiplier is more than one digit, you use the same process and get partial products. You repeat the steps until you have multiplied by every digit, then add the partial products together.

Multiplying by Two-Digit Multipliers

Example A

$$24 \times 23 =$$

Part 1: Multiply by the ones digit in the multiplier.

Multiply 3 ones by 24 using the method you already know. The first partial product is 72.

$$\begin{array}{r} 1 \\ 24 \\ \times 23 \\ \hline 72 \end{array}$$

Part 2: Multiply by the tens digit in the multiplier. First, put a 0 to hold the ones place in your partial product. We are multiplying by a ten, so we hold the ones place.

Step 1: Multiply 2 tens \times 4 ones = 8 tens Write the 8 tens under the tens in your first partial product. It is very important to keep the columns straight – ones under one, tens under tens.

Step 2: Multiply 2 tens \times 2 tens = 4 hundreds Write the 4 hundreds in your partial product. The second partial product is 480.

$$\begin{array}{r} 1 \\ 24 \\ \times 23 \\ \hline 72 \\ 480 \end{array}$$

Part 3: Add the partial products together, being sure to add ones to ones, tens to tens, hundreds to hundreds. The sum is the final product.

Draw a line under the partial products. Add. Check your addition.

$$\begin{array}{r}
 1 \\
 24 \\
 \times 23 \\
 \hline
 72 \\
 + 480 \\
 \hline
 552
 \end{array}$$

Example B

$$36 \times 425 =$$

Part 1: Multiply by the ones digit in the multiplier. $6 \times 425 = 2\,550$

$$\begin{array}{r}
 1\ 3 \\
 425 \\
 \times 36 \\
 \hline
 2550
 \end{array}$$

Part 2: Multiply by the tens digit in the multiplier. First put a 0 to hold the ones place in the second partial product.

- **Step 1:** $3\text{ tens} \times 5\text{ tens} = 15\text{ tens} = 1\text{ hundred and }5\text{ tens}$
Write the 5 tens in the second partial product and carry the 1 hundred. Now you can see why it is best to cross out the numbers you carry as soon as you have added them to the product.
- **Step 2:** $3\text{ tens} \times 2\text{ tens} = 6\text{ hundreds}$
 $6\text{ hundreds} + 1\text{ hundred (carried)} = 7\text{ hundreds}$. There is nothing to carry.
- **Step 3:** $3\text{ tens} \times 4\text{ hundreds} = 12\text{ thousands}$

$$\begin{array}{r}
 1 \\
 13 \\
 425 \\
 \times \quad 36 \\
 \hline
 2550 \\
 12750
 \end{array}$$

Part 3: Add the partial products together.

$$\begin{array}{r}
 1 \\
 13 \\
 425 \\
 \times \quad 36 \\
 \hline
 2550 \\
 + 12750 \\
 \hline
 15300
 \end{array}$$

Tip: Keeping the columns straight with ones under ones, tens under tens, hundreds under hundreds is very important. Working on large-squared graphing paper using one digit per square is often helpful.

tens \times tens = hundreds
tens \times hundreds = thousands

Exercise 1

Multiply, being very careful to keep the columns straight when you write your partial products. Check your work using the answer key at the end of the exercise.

$$\begin{array}{r} 84 \\ \times 12 \\ \hline 168 \\ + 840 \\ \hline 1008 \end{array}$$

a.
$$\begin{array}{r} 73 \\ \times 12 \\ \hline \end{array}$$

d.
$$\begin{array}{r} 61 \\ \times 42 \\ \hline \end{array}$$

g.
$$\begin{array}{r} 91 \\ \times 49 \\ \hline \end{array}$$

b.
$$\begin{array}{r} 50 \\ \times 42 \\ \hline \end{array}$$

e.
$$\begin{array}{r} 91 \\ \times 53 \\ \hline \end{array}$$

h.
$$\begin{array}{r} 72 \\ \times 48 \\ \hline \end{array}$$

c.
$$\begin{array}{r} 62 \\ \times 31 \\ \hline \end{array}$$

f.
$$\begin{array}{r} 92 \\ \times 31 \\ \hline \end{array}$$

i.
$$\begin{array}{r} 53 \\ \times 30 \\ \hline \end{array}$$

32 Unit 1: Multiplication

$$\begin{array}{r} 41 \\ j. \times 53 \\ \hline \end{array}$$

$$\begin{array}{r} 54 \\ n. \times 40 \\ \hline \end{array}$$

$$\begin{array}{r} 84 \\ r. \times 56 \\ \hline \end{array}$$

$$\begin{array}{r} 42 \\ k. \times 94 \\ \hline \end{array}$$

$$\begin{array}{r} 61 \\ o. \times 48 \\ \hline \end{array}$$

$$\begin{array}{r} 53 \\ s. \times 38 \\ \hline \end{array}$$

$$\begin{array}{r} 80 \\ l. \times 86 \\ \hline \end{array}$$

$$\begin{array}{r} 60 \\ p. \times 31 \\ \hline \end{array}$$

$$\begin{array}{r} 31 \\ m. \times 79 \\ \hline \end{array}$$

$$\begin{array}{r} 55 \\ q. \times 73 \\ \hline \end{array}$$

Answers to Exercise 1

- | | | |
|----------|----------|----------|
| a. 876 | h. 3 456 | o. 2 928 |
| b. 2 100 | i. 1 590 | p. 1 860 |
| c. 1 922 | j. 2 173 | q. 4 015 |
| d. 2 562 | k. 3 948 | r. 4 704 |
| e. 4 823 | l. 6 880 | s. 2 014 |
| f. 2 852 | m. 2 449 | |
| g. 4 459 | n. 2 160 | |

When the multiplier has a zero in the ones place, use this shortcut.

Example C

$$\begin{array}{r} 48 \\ \times 80 \\ \hline 3840 \end{array}$$

Step 1: $0 \text{ ones} \times 48 = 0$. Place one zero in the product and that will hold the ones place.

Step 2: Multiply by the tens digit and write the product beside the zero.

Example D

$$\begin{array}{r} 97 \\ \times 20 \\ \hline 1940 \end{array}$$

Exercise 2

Find the products. Use the shortcut for multipliers with a zero in them. Check your work using the answer key at the end of the exercise.

$$\begin{array}{r} 76 \\ \times 70 \\ \hline 5320 \end{array}$$

a.
$$\begin{array}{r} 52 \\ \times 70 \\ \hline \end{array}$$

e.
$$\begin{array}{r} 61 \\ \times 70 \\ \hline \end{array}$$

i.
$$\begin{array}{r} 432 \\ \times 70 \\ \hline \end{array}$$

b.
$$\begin{array}{r} 91 \\ \times 70 \\ \hline \end{array}$$

f.
$$\begin{array}{r} 16 \\ \times 70 \\ \hline \end{array}$$

j.
$$\begin{array}{r} 863 \\ \times 70 \\ \hline \end{array}$$

c.
$$\begin{array}{r} 83 \\ \times 70 \\ \hline \end{array}$$

g.
$$\begin{array}{r} 36 \\ \times 70 \\ \hline \end{array}$$

k.
$$\begin{array}{r} 907 \\ \times 70 \\ \hline \end{array}$$

d.
$$\begin{array}{r} 49 \\ \times 70 \\ \hline \end{array}$$

h.
$$\begin{array}{r} 398 \\ \times 70 \\ \hline \end{array}$$

l.
$$\begin{array}{r} 503 \\ \times 70 \\ \hline \end{array}$$

$$\begin{array}{r} 452 \\ m. \times 70 \\ \hline \end{array}$$

$$\begin{array}{r} 9025 \\ q. \times 70 \\ \hline \end{array}$$

$$\begin{array}{r} 3952 \\ u. \times 70 \\ \hline \end{array}$$

$$\begin{array}{r} 943 \\ n. \times 70 \\ \hline \end{array}$$

$$\begin{array}{r} 8907 \\ r. \times 70 \\ \hline \end{array}$$

$$\begin{array}{r} 1528 \\ v. \times 70 \\ \hline \end{array}$$

$$\begin{array}{r} 248 \\ o. \times 70 \\ \hline \end{array}$$

$$\begin{array}{r} 300 \\ s. \times 70 \\ \hline \end{array}$$

$$\begin{array}{r} 7106 \\ w. \times 70 \\ \hline \end{array}$$

$$\begin{array}{r} 6287 \\ p. \times 70 \\ \hline \end{array}$$

$$\begin{array}{r} 9075 \\ t. \times 70 \\ \hline \end{array}$$

Answers to Exercise 2

a. 3 640

b. 6 370

c. 5 810

d. 3 430

e. 4 270

f. 1 120

g. 2 520

h. 27 860

i. 30 240

j. 60 410

k. 63 490

l. 35 210

m. 31 640

n. 66 010

o. 17 360

p. 440 090

q. 631 750

r. 623 490

s. 21 000

t. 635 250

u. 276 640

v. 106 960

w. 497 420

Multiplying by Three-Digit Multipliers

To multiply by three digit multipliers, use the same method with one more part.

Example E

$$417 \times 368 =$$

$$\begin{array}{r}
 417 \\
 \times 368 \\
 \hline
 3336 \\
 25020 \\
 + 125100 \\
 \hline
 153456
 \end{array}$$

Part 1: Multiply by the 8 ones.

Part 2: Multiply the 6 tens; hold the ones place with 0.

Part 3: Multiply by the 3 hundreds. Put 00 to hold the ones and tens places in the third partial product.

- **Step 1:** 3 hundreds \times 7 ones = 21 hundreds = 2 thousands and 1 hundred. Write the 1 hundred and carry the 2 thousands.
- **Step 2:** 3 hundreds \times 1 ten = 3 thousands. 3 thousands + 2 thousands (carried) = 5 thousands.
- **Step 3:** 3 hundreds \times 4 hundreds = 12 ten thousands.

Part 4: Add the partial products.

Exercise 3

Find the products. Check your work using the answer key at the end of the exercise.

$$\begin{array}{r} 416 \\ \times 213 \\ \hline \end{array}$$

$$\begin{array}{r} 275 \\ \times 863 \\ \hline \end{array}$$

$$\begin{array}{r} 498 \\ \times 123 \\ \hline \end{array}$$

$$\begin{array}{r} 375 \\ \times 291 \\ \hline \end{array}$$

$$\begin{array}{r} 984 \\ \times 469 \\ \hline \end{array}$$

$$\begin{array}{r} 267 \\ \times 854 \\ \hline \end{array}$$

$$\begin{array}{r} 361 \\ \times 475 \\ \hline \end{array}$$

$$\begin{array}{r} 489 \\ \times 578 \\ \hline \end{array}$$

$$\begin{array}{r} 613 \\ \times 368 \\ \hline \end{array}$$

$$\begin{array}{r} 725 \\ \times 547 \\ \hline \end{array}$$

$$\begin{array}{r} 752 \\ \times 697 \\ \hline \end{array}$$

$$\begin{array}{r} 835 \\ \times 148 \\ \hline \end{array}$$

$$\begin{array}{r} 269 \\ \times 912 \\ \hline \end{array}$$

$$\begin{array}{r} 983 \\ \times 357 \\ \hline \end{array}$$

$$\begin{array}{r} 386 \\ \times 296 \\ \hline \end{array}$$

Answers to Exercise 3

- a. 88 608
- b. 109 125
- c. 171 475
- d. 237 325
- e. 461 496

- f. 282 642
- g. 61 254
- h. 228 018
- i. 225 584
- j. 396 575

- k. 245 328
- l. 524 144
- m. 350 931
- n. 123 580
- o. 114 256

You know to hold the ones place with a zero if the multiplier has a zero in the ones place. Use the same skill if the multiplier has a zero in the tens place.

Example F

$$927 \times 405 =$$

$$\begin{array}{r} 927 \\ \times 405 \\ \hline 4635 \\ + 370800 \\ \hline 375435 \end{array}$$

- **Part 1:** Multiply by the 5 ones.
- **Part 2:** Multiply by the 0 tens.
Hold the ones place with a 0; $0 \times 927 = 0$; Place one zero in the tens place in the second partial product.
- **Part 3:** Multiply by the 4 hundreds. The ones and tens places are already held by zeros. Start this partial product in the hundreds place on the same line.
- **Part 4:** Add the partial products.

Exercise 4

Find the products. Check your work using the answer key at the end of the exercise.

$$\begin{array}{r}
 22 \\
 698 \\
 \times 301 \\
 \hline
 698 \\
 + 209400 \\
 \hline
 210098
 \end{array}$$

a.
$$\begin{array}{r}
 923 \\
 \times 403 \\
 \hline
 \end{array}$$

c.
$$\begin{array}{r}
 482 \\
 \times 206 \\
 \hline
 \end{array}$$

e.
$$\begin{array}{r}
 625 \\
 \times 405 \\
 \hline
 \end{array}$$

b.
$$\begin{array}{r}
 830 \\
 \times 108 \\
 \hline
 \end{array}$$

d.
$$\begin{array}{r}
 432 \\
 \times 205 \\
 \hline
 \end{array}$$

f.
$$\begin{array}{r}
 275 \\
 \times 306 \\
 \hline
 \end{array}$$

$$\begin{array}{r} \text{g.} \quad 765 \\ \times 506 \\ \hline \end{array}$$

$$\begin{array}{r} \text{j.} \quad 625 \\ \times 409 \\ \hline \end{array}$$

$$\begin{array}{r} \text{m.} \quad 7384 \\ \times 104 \\ \hline \end{array}$$

$$\begin{array}{r} \text{h.} \quad 1576 \\ \times 702 \\ \hline \end{array}$$

$$\begin{array}{r} \text{k.} \quad 175 \\ \times 306 \\ \hline \end{array}$$

$$\begin{array}{r} \text{n.} \quad 6538 \\ \times 603 \\ \hline \end{array}$$

$$\begin{array}{r} \text{i.} \quad 432 \\ \times 405 \\ \hline \end{array}$$

$$\begin{array}{r} \text{l.} \quad 5874 \\ \times 309 \\ \hline \end{array}$$

Answers to Exercise 4

- a. 371 969
- b. 89 640
- c. 99 292
- d. 88 560
- e. 253 125

- f. 84 150
- g. 387 090
- h. 1 106 352
- i. 174 960
- j. 255 625

- k. 53 550
- l. 1 815 066
- m. 767 936
- n. 3 942 414

Multiplying by 10, 100, and 1 000

Exercise 5

Do the following questions and see if you can find the pattern. Check your work using the answer key at the end of the exercise.

$$\begin{array}{r} \text{a.} \quad 83 \\ \times 10 \\ \hline 830 \end{array}$$

$$\begin{array}{r} \text{f.} \quad 129 \\ \times 10 \\ \hline \end{array}$$

$$\begin{array}{r} \text{k.} \quad 432 \\ \times 100 \\ \hline \end{array}$$

$$\begin{array}{r} \text{b.} \quad 46 \\ \times 10 \\ \hline \end{array}$$

$$\begin{array}{r} \text{g.} \quad 1852 \\ \times 10 \\ \hline \end{array}$$

$$\begin{array}{r} \text{l.} \quad 679 \\ \times 100 \\ \hline \end{array}$$

$$\begin{array}{r} \text{c.} \quad 97 \\ \times 10 \\ \hline \end{array}$$

$$\begin{array}{r} \text{h.} \quad 29871 \\ \times 10 \\ \hline \end{array}$$

$$\begin{array}{r} \text{m.} \quad 2482 \\ \times 100 \\ \hline \end{array}$$

$$\begin{array}{r} \text{d.} \quad 123 \\ \times 10 \\ \hline \end{array}$$

$$\begin{array}{r} \text{i.} \quad 45 \\ \times 100 \\ \hline \end{array}$$

$$\begin{array}{r} \text{n.} \quad 9037 \\ \times 100 \\ \hline \end{array}$$

$$\begin{array}{r} \text{e.} \quad 70 \\ \times 10 \\ \hline \end{array}$$

$$\begin{array}{r} \text{j.} \quad 26 \\ \times 100 \\ \hline \end{array}$$

$$\begin{array}{r} \text{o.} \quad 46207 \\ \times 100 \\ \hline \end{array}$$

$$\begin{array}{r} 97512 \\ \times 100 \\ \hline \end{array}$$

$$\begin{array}{r} 207 \\ \times 1000 \\ \hline \end{array}$$

$$\begin{array}{r} 2431 \\ \times 1000 \\ \hline \end{array}$$

$$\begin{array}{r} 23 \\ \times 1000 \\ \hline \end{array}$$

$$\begin{array}{r} 348 \\ \times 1000 \\ \hline \end{array}$$

$$\begin{array}{r} 23681 \\ \times 1000 \\ \hline \end{array}$$

$$\begin{array}{r} 452 \\ \times 1000 \\ \hline \end{array}$$

$$\begin{array}{r} 2118 \\ \times 1000 \\ \hline \end{array}$$

$$\begin{array}{r} 48203 \\ \times 1000 \\ \hline \end{array}$$

Answers to Exercise 5

a. 830

b. 460

c. 970

d. 1 230

e. 700

f. 1 290

g. 18 520

h. 298 710

i. 4 500

j. 2 600

k. 43 200

l. 67 900

m. 248 200

n. 903 700

o. 4 620 700

p. 9 751 200

q. 23 000

r. 452 000

s. 207 000

t. 348 000

u. 2 118 000

v. 2 431 000

w. 23 681 000

x. 48 203 000

And the pattern is ...

When multiplying by 10, 100, 1 000, 10 000, etc., place as many zeros to the right of the number as there are zeros in the 10, 100, 1 000, etc.

- To multiply by 10 put one zero after the number.
- To multiply by 100 put two zeros after the number.
- To multiply by 1 000 put three zeros after the number.

Exercise 6

Find the products using the short method. Do not rewrite the questions. Check your work using the answer key at the end of the exercise.

a. $12 \times 10 = 120$

h. $1\,134 \times 10 =$

b. $10 \times 3\,175 =$

i. $15 \times 100 =$

c. $162 \times 10 =$

j. $100 \times 278 =$

d. $10 \times 53\,821 =$

k. $9\,134 \times 100 =$

e. $10 \times 123 =$

l. $651 \times 100 =$

f. $27\,342 \times 10 =$

m. $100 \times 5\,169 =$

g. $10 \times 98 =$

n. $100 \times 24\,815 =$

o. $10 \times 905 =$

t. $1\,000 \times 8\,902 =$

p. $45\,683 \times 10 =$

u. $1\,576 \times 1\,000 =$

q. $1\,000 \times 87 =$

v. $31\,584 \times 1\,000 =$

r. $521 \times 1\,000 =$

w. $1\,000 \times 426 =$

s. $1\,000 \times 68\,935 =$

x. $72 \times 1\,000 =$

Answers to Exercise 6

a. 120

m. 516 900

b. 31 750

n. 2 481 500

c. 1 620

o. 9 050

d. 538 210

p. 456 830

e. 1 230

q. 87 000

f. 273 420

r. 521 000

g. 980

s. 68 935 000

h. 11 340

t. 8 902 000

i. 1 500

u. 1 576 000

j. 27 800

v. 31 584 000

k. 913 400

w. 426 000

l. 65 100

x. 72 000

Topic B: Self-Test**Mark /12 Aim 10/12**

Multiply these numbers.

a.
$$\begin{array}{r} 47 \\ \times 39 \\ \hline \end{array}$$

d.
$$\begin{array}{r} 982 \\ \times 1000 \\ \hline \end{array}$$

g.
$$\begin{array}{r} 8703 \\ \times 93 \\ \hline \end{array}$$

b.
$$\begin{array}{r} 58 \\ \times 93 \\ \hline \end{array}$$

e.
$$\begin{array}{r} 678 \\ \times 39 \\ \hline \end{array}$$

h.
$$\begin{array}{r} 7390 \\ \times 85 \\ \hline \end{array}$$

c.
$$\begin{array}{r} 48 \\ \times 100 \\ \hline \end{array}$$

f.
$$\begin{array}{r} 4579 \\ \times 86 \\ \hline \end{array}$$

i.
$$\begin{array}{r} 8047 \\ \times 236 \\ \hline \end{array}$$

$$\begin{array}{r} 4238 \\ \times 197 \\ \hline \end{array}$$

$$\begin{array}{r} 8200 \\ \times 444 \\ \hline \end{array}$$

$$\begin{array}{r} 7265 \\ \times 409 \\ \hline \end{array}$$

Answers to Topic B Self-Test

Multiply these numbers.

a. 1 833

b. 5 394

c. 4 800

d. 982 000

e. 26 442

f. 393 794

g. 809 379

h. 628 150

i. 1 899 092

j. 834 886

k. 3 640 800

l. 2 971 385

Topic C: Estimating Products

Before you practice estimating products, look at the easy multiplication that can be done when the factors end in zeros.

You already know how to quickly multiply by 10, 100, 1 000, etc...

You can find the products in questions like these using regular multiplication:

But here is a shortcut:

1. Count all the zeros at the end of the numbers in both factors.
2. Write down that many zeros at the end of the product.
3. Multiply the other digits in the usual way and put them before the zeros.

Example A

$$30 \times 500 =$$

- How many zeros at the end of the factors? **3**
- Write them down. **000**
- Multiply the other digits and put them before the zeros. **$3 \times 5 = 15$**

$$30 \times 500 = 15\,000$$

Example B

$$400 \times 3\,000 =$$

- How many zeros at the end of the factors? 5
- Write them down: **00 000**
- Multiply the other digits and put them before the zeros. $4 \times 3 = 12$

$$400 \times 3\,000 = 1\,200\,000$$

Exercise 1

Find the products using the shortcut. Check your work using the answer key at the end of the exercise.

$$\begin{array}{r} \text{a.} \quad 300 \\ \times \quad 20 \\ \hline 6000 \end{array}$$

$$\begin{array}{r} \text{d.} \quad 800 \\ \times \quad 600 \\ \hline \end{array}$$

$$\begin{array}{r} \text{g.} \quad 50000 \\ \times \quad 6000 \\ \hline \end{array}$$

$$\begin{array}{r} \text{b.} \quad 6000 \\ \times \quad 200 \\ \hline \end{array}$$

$$\begin{array}{r} \text{e.} \quad 400 \\ \times \quad 500 \\ \hline \end{array}$$

$$\begin{array}{r} \text{h.} \quad 80000 \\ \times \quad 30 \\ \hline \end{array}$$

$$\begin{array}{r} \text{c.} \quad 210 \\ \times \quad 20 \\ \hline \end{array}$$

$$\begin{array}{r} \text{f.} \quad 6000 \\ \times \quad 90 \\ \hline \end{array}$$

$$\begin{array}{r} \text{i.} \quad 5000 \\ \times \quad 50 \\ \hline \end{array}$$

$$\begin{array}{r} 70 \\ \times 80 \\ \hline \end{array}$$

$$\begin{array}{r} 90000 \\ \times 2000 \\ \hline \end{array}$$

$$\begin{array}{r} 7200 \\ \times 5000 \\ \hline \end{array}$$

$$\begin{array}{r} 3000 \\ \times 700 \\ \hline \end{array}$$

$$\begin{array}{r} 600 \\ \times 600 \\ \hline \end{array}$$

$$\begin{array}{r} 7000 \\ \times 7000 \\ \hline \end{array}$$

$$\begin{array}{r} 50000 \\ \times 900 \\ \hline \end{array}$$

$$\begin{array}{r} 40000 \\ \times 800 \\ \hline \end{array}$$

$$\begin{array}{r} 61000 \\ \times 400 \\ \hline \end{array}$$

$$\begin{array}{r} 9000 \\ \times 8000 \\ \hline \end{array}$$

$$\begin{array}{r} 2400 \\ \times 70 \\ \hline \end{array}$$

$$\begin{array}{r} 5200 \\ \times 300 \\ \hline \end{array}$$

$$\begin{array}{r} 60000 \\ \times 90 \\ \hline \end{array}$$

$$\begin{array}{r} 390 \\ \times 40 \\ \hline \end{array}$$

$$\begin{array}{r} 40 \\ \times 60 \\ \hline \end{array}$$

Answers to Exercise 1

a. 6 000

b. 1 200 000

c. 4 200

d. 480 000

e. 200 000

f. 540 000

g. 300 000 000

h. 2 400 000

i. 250 000

j. 5 600

k. 2 100 000

l. 45 000 000

m. 72 000 000

n. 5 400 000

o. 180 000 000

p. 360 000

q. 32 000 000

r. 168 000

s. 15 600

u. 49 000 000

w. 1 560 000

t. 36 000 000

v. 24 400 000

x. 2 400

To find an estimated product, round the factors before you multiply. If a factor has only one digit, do not round it.

Example C

$$\begin{array}{r} 6258 \\ \times \quad 3 \\ \hline \end{array}$$

6 258 rounds to 6 000. Leave 3 as is.

$$\begin{array}{r} 6000 \\ \times \quad 3 \\ \hline 18000 \end{array}$$

18 000 is the estimated product.

Example D

$$\begin{array}{r} 491 \\ \times \quad 24 \\ \hline \end{array}$$

491 rounds to 500. 24 rounds to 20.

$$\begin{array}{r} 500 \\ \times \quad 20 \\ \hline 10000 \end{array}$$

10 000 is the estimated product.

Topic C: Self-Test**Mark /18 Aim 15/18**

A. Multiply these numbers.

a.
$$\begin{array}{r} 600 \\ \times 70 \\ \hline \end{array}$$

c.
$$\begin{array}{r} 5000 \\ \times 600 \\ \hline \end{array}$$

e.
$$\begin{array}{r} 400 \\ \times 50 \\ \hline \end{array}$$

b.
$$\begin{array}{r} 9000 \\ \times 30 \\ \hline \end{array}$$

d.
$$\begin{array}{r} 3000 \\ \times 500 \\ \hline \end{array}$$

f.
$$\begin{array}{r} 8000 \\ \times 1000 \\ \hline \end{array}$$

B. Find an estimated product.

a.
$$\begin{array}{r} 87 \\ \times 23 \\ \hline \end{array}$$

c.
$$\begin{array}{r} 9421 \\ \times 75 \\ \hline \end{array}$$

e.
$$\begin{array}{r} 365 \\ \times 455 \\ \hline \end{array}$$

b.
$$\begin{array}{r} 268 \\ \times 25 \\ \hline \end{array}$$

d.
$$\begin{array}{r} 2632 \\ \times 49 \\ \hline \end{array}$$

f.
$$\begin{array}{r} 7264 \\ \times 590 \\ \hline \end{array}$$

Answers to Topic C Self Test

A. Multiply these numbers.

a. 42 000

c. 3 000 000

e. 20 000

b. 270 000

d. 1 500 000

f. 8 000 000

B. Find an estimated product.

a. $90 \times 20 = 1\,800$

c. $9\,000 \times 80 = 720\,000$

e. $400 \times 500 = 200\,000$

b. $300 \times 30 = 9\,000$

d. $3\,000 \times 50 = 150\,000$

f. $7\,000 \times 600 = 4\,200\,000$

Topic D: Multiplication Problems

Multiplication problems usually give information for one unit and ask information for many units. For example, you may be given an average distance for one hour and asked for a distance for six hours. You may be given the price for one item and asked the price for 96 items.

Remember that multiplication is fast addition of equal amounts. Key words for addition may also point to multiplication.

Key words that point to multiplication:

- altogether
- er
- combine
- d
- in all
- total
- the average is
- product
- how many?
- how much?
- each

Exercise 1

Do these problems by following the five problem-solving steps. Remember to circle the information and underline what is being asked. Be sure to write down your estimation before you find the actual solution. Check your work using the answer key at the end of the exercise.

- a. Maria spent \$151 a month to ride to work. How much did it cost her to ride to work for the whole year? (1 year = 12 months)

- b. Fred travels 121 km a day on his delivery route. How far does he travel in 5 working days?
- c. Manuel buys 340 L of gas a month. In 6 months, how many litres of gas does Manuel buy?
- d. An apartment building has 16 apartments, each rented for \$870 a month. What is the total monthly rental income from this building?

- e. A farmer sells potatoes at \$53 per 50 kg sack. How much will he get for 75 sacks?
- f. Bob is paid \$12 per hour. If he worked 39 hours last week and 24 hours this week, how much did he earn for the two weeks? (two operations)
- g. It costs \$35 260 per working day to run the factory. How much does it cost to run this factory for a month of 23 working days?

- h. The train has an average speed of 75 km an hour. How far does this train travel in 14 hours?
- i. Lee's sports car averages 18 km per litre. How far can she drive on 12 L of gasoline?
- j. Frank bought a used car and paid for it over 15 months. He made 15 monthly payments of \$325 each. How much did he pay?

Answers to Exercise 1

a. \$1 812

b. 605 km

c. 2 040 L

d. \$13 920

e. \$3 975

f. 63 hours, \$756

g. \$810 980

h. 1 050 km

i. 216 km

j. \$4 875

Topic D: Self-Test

Mark /8 Aim 6/8

Solve these problems. Show all your work. Give yourself one mark for the correct method and one mark for the correct answer.

a. A freight train has 70 cars. Each car can hold 22 680 kilograms of cargo. How much cargo can the train hold in all?

b. The highway distance between Fernie and Edmonton is 621 kilometres. How many kilometres will a bus travel in 68 trips from Fernie to Edmonton?

c. A tanker truck made 275 trips in one year. The truck hauled 23,800 litres each time. How many litres did the truck haul during the year?

d. The college cafeteria hopes to serve 425 people each day. Estimate how many meals will be served if the cafeteria is open 175 days.

Answers to Topic D Self-Test

- a. 1 587 600 kilograms
- b. 42 228 kilometres
- c. 6 545 000 litres
- d. $400 \times 200 = 80\,000$ meals

Unit 1 Review: Multiplication

You will now practice all the skills you learned in Unit 1. Check your work using the answer key at the end of the review.

A. Find the products.

$$\begin{array}{r} 81 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 441 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 9342 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 73 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 512 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 8132 \\ \times 3 \\ \hline \end{array}$$

B. Find the products.

$$\begin{array}{r} 48 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 892 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 2375 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 78 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 536 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 5649 \\ \times 3 \\ \hline \end{array}$$

C. Find the products.

$$\begin{array}{r} 67 \\ \times 19 \\ \hline \end{array}$$

$$\begin{array}{r} 754 \\ \times 692 \\ \hline \end{array}$$

$$\begin{array}{r} 629 \\ \times 407 \\ \hline \end{array}$$

$$\begin{array}{r} 581 \\ \times 34 \\ \hline \end{array}$$

$$\begin{array}{r} 2735 \\ \times 846 \\ \hline \end{array}$$

$$\begin{array}{r} 2805 \\ \times 15 \\ \hline \end{array}$$

$$\begin{array}{r} 7310 \\ \times 46 \\ \hline \end{array}$$

$$\begin{array}{r} 857 \\ \times 308 \\ \hline \end{array}$$

$$\begin{array}{r} 5102 \\ \times 743 \\ \hline \end{array}$$

D. Find the products. Use the shortcut.

$$\begin{array}{r} 1000 \\ \times 82 \\ \hline \end{array}$$

$$\begin{array}{r} 100 \\ \times 26 \\ \hline \end{array}$$

$$\begin{array}{r} 6263 \\ \times 1000 \\ \hline \end{array}$$

d. $407 \times 100 =$

f. $3\,614 \times 10 =$

e. $100 \times 9\,482 =$

g. $1\,000 \times 1\,795 =$

E. Find the products. Use the shortcut.

$$\begin{array}{r} 50 \\ \times 40 \\ \hline \end{array}$$

$$\begin{array}{r} 600 \\ \times 800 \\ \hline \end{array}$$

$$\begin{array}{r} 9000 \\ \times 500 \\ \hline \end{array}$$

F. Find an estimated product.

$$\begin{array}{r} 68 \\ \times 39 \\ \hline \end{array}$$

$$\begin{array}{r} 853 \\ \times 399 \\ \hline \end{array}$$

$$\begin{array}{r} 185 \\ \times 94 \\ \hline \end{array}$$

$$\begin{array}{r} 2735 \\ \times 846 \\ \hline \end{array}$$

$$\begin{array}{r} 6763 \\ \times 69 \\ \hline \end{array}$$

$$\begin{array}{r} 68924 \\ \times 268 \\ \hline \end{array}$$

G. Word problems.

a. The Yellow River in China is 5 464 kilometres long. How many kilometres will 75 boats cover if they travel the length of the river?

b. Mount Logan in Canada is 5 959 metres high. How many metres would 24 climbers cover if they were able to climb to the top of Mt. Logan?

c. How many pieces of candy are needed to pack 500 boxes, if each box has 8 rows and each row has 15 pieces of candy? (2-step question)

- d. The distance between Prince Rupert and Kelowna is 1 409 km. Estimate how many kilometres 42 trucks will travel if each truck makes one trip.

Answers to Unit 1 Review

A. Find the products.

- | | | |
|--------|----------|-----------|
| a. 405 | c. 882 | e. 18 684 |
| b. 219 | d. 2 048 | f. 24 396 |

B. Find the products.

- | | | |
|--------|----------|-----------|
| a. 336 | c. 7 136 | e. 9 500 |
| b. 702 | d. 3 216 | f. 16 947 |

C. Find the products.

- | | | |
|------------|--------------|--------------|
| a. 1 273 | d. 521 768 | g. 256 003 |
| b. 19 754 | e. 2 313 810 | h. 42 075 |
| c. 336 260 | f. 263 956 | i. 3 790 786 |

D. Find the products. Use the shortcut.

- | | | |
|--------------|------------|--------------|
| a. 82 000 | d. 40 700 | g. 1 795 000 |
| b. 2 600 | e. 948 200 | |
| c. 6 263 000 | f. 36 140 | |

E. Find the products. Use the shortcut.

- | | |
|------------|--------------|
| a. 2 000 | c. 4 500 000 |
| b. 480 000 | |

F. Find an estimated product.

a. $70 \times 40 = 2\,800$

b. $200 \times 90 = 18\,000$

c. $7\,000 \times 70 = 490\,000$

d. $900 \times 400 = 360\,000$

e. $3\,000 \times 800 = 2\,400\,000$

f. $70\,000 \times 300 = 21\,000\,000$

G. Word problems.

a. 409 800 kilometres

b. 143 016 metres or 286 032 there and back

c. 60 000 pieces of candy

d. $1\,000 \times 40 = 40\,000$ kilometres

CONGRATULATIONS!!

Now you have finished Unit 1.

TEST TIME!

Ask your instructor for the practice test for this unit.

Once you've done the practice test, you need to do the unit 1 test. Again, ask your instructor for this.

Good luck!

Unit 2: Division

Topic A: Introduction and Division Facts

Division is an interesting operation. Both these signs tell you to divide:

$$8 \div 4 \quad 4 \overline{)8}$$

Division is the opposite of multiplication.

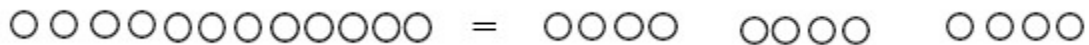
Multiplication takes equal-sized groups and puts the groups together to find the total.

$$3 \times 4 = 12$$



Division takes the total and separates that amount into equal groups. You can find the number of equal groups or the size of each group.

$$12 \div 4 = 3$$



$$4 \times 3 = 12$$

$$12 \div 3 = 4$$

$$\begin{array}{r} 4 \\ 3 \overline{)12} \end{array}$$

$$3 \times 4 = 12$$

$$12 \div 4 = 3$$

$$\begin{array}{r} 3 \\ 4 \overline{)12} \end{array}$$

Learn this vocabulary for division:

- Dividend – The number or quantity to be divided; the amount altogether.
- Divisor – The number we divide by. The divisor tells us the number of groups or the quantity in each group that the dividend is to be separated into.
- Quotient – (“kw ō shent”) The answer to a division question.

$$\begin{array}{r} \text{quotient} \\ \text{divisor} \overline{) \text{dividend}} \end{array} \quad \text{dividend} \div \text{divisor} = \text{quotient}$$

If you have learned your times tables well, the division facts will be easier. The times table chart can be used to find division facts.

To use the times table chart for division facts:

- Find the divisor in the column on the left of the times table chart.
- Run your finger in a straight line across the divisor row until you come to the dividend.
- Go straight up that column and the quotient should be the top number.

Try a few while you are doing Exercise 1.

Exercise 1

Complete this chart to help yourself understand the connection between multiplication and division. The first one is done for you. Check your work using the answer key at the end of the exercise.

#	Multiplication	Division	Division	“Say”
a	$5 \times 3 = 15$ $3 \times 5 = 15$	$15 \div 3 = 5$ $15 \div 5 = 3$	$\begin{array}{r} 5 \\ 3 \overline{)15} \\ \underline{3} \\ 5 \overline{)15} \\ \underline{15} \\ 0 \end{array}$	15 divided by 3 is 5 15 divided by 5 is 3
b	$8 \times 6 = 48$ $6 \times 8 = 48$	$48 \div 6 = 8$ $48 \div 8 = 6$	$\begin{array}{r} 8 \\ 6 \overline{)48} \\ \underline{48} \\ 0 \end{array}$ $\begin{array}{r} 6 \\ 8 \overline{)48} \\ \underline{48} \\ 0 \end{array}$	48 divided by 6 is 8.
c	$3 \times 7 = 21$			
d	$5 \times 9 = 45$			
e	$4 \times 6 = 24$			
f	$2 \times 8 = 16$			

g	$7 \times 10 = 70$			
h	$6 \times 9 = 54$			
i	$9 \times 4 = 36$			
j	$6 \times 7 = 42$			

Answers to Exercise 1

#	Multiplication	Division	Division	“Say”
a	$5 \times 3 = 15$ $3 \times 5 = 15$	$15 \div 3 = 5$ $15 \div 5 = 3$	$\begin{array}{r} 5 \\ 3 \overline{)15} \\ \hline \end{array}$ $\begin{array}{r} 3 \\ 5 \overline{)15} \\ \hline \end{array}$	<p>15 divided by 3 is 5</p> <p>15 divided by 5 is 3</p>
b	$8 \times 6 = 48$ $6 \times 8 = 48$	$48 \div 6 = 8$ $48 \div 8 = 6$	$\begin{array}{r} 8 \\ 6 \overline{)48} \\ \hline \end{array}$ $\begin{array}{r} 6 \\ 8 \overline{)48} \\ \hline \end{array}$	<p>48 divided by 6 is 8.</p> <p>48 divided by 8 is 6.</p>
c	$3 \times 7 = 21$ $7 \times 3 = 21$	$21 \div 7 = 3$ $21 \div 3 = 7$	$\begin{array}{r} 3 \\ 7 \overline{)21} \\ \hline \end{array}$ $\begin{array}{r} 7 \\ 3 \overline{)21} \\ \hline \end{array}$	<p>21 divided by 7 is 3.</p> <p>21 divided by 3 is 7.</p>
d	$5 \times 9 = 45$ $9 \times 5 = 45$	$45 \div 9 = 5$ $45 \div 5 = 9$	$\begin{array}{r} 5 \\ 9 \overline{)45} \\ \hline \end{array}$ $\begin{array}{r} 9 \\ 5 \overline{)45} \\ \hline \end{array}$	<p>45 divided by 9 is 5.</p> <p>45 divided by 5 is 9.</p>
e	$4 \times 6 = 24$ $6 \times 4 = 24$	$24 \div 6 = 4$ $24 \div 4 = 6$	$\begin{array}{r} 4 \\ 6 \overline{)24} \\ \hline \end{array}$ $\begin{array}{r} 6 \\ 4 \overline{)24} \\ \hline \end{array}$	<p>24 divided by 6 is 4.</p> <p>24 divided by 4 is 6.</p>

#	Multiplication	Division	Division	“Say”
f	$2 \times 8 = 16$ $8 \times 2 = 16$	$16 \div 8 = 2$ $16 \div 2 = 8$	$\begin{array}{r} 2 \\ 8 \overline{)16} \\ \underline{16} \\ 0 \end{array}$ $\begin{array}{r} 8 \\ 2 \overline{)16} \\ \underline{16} \\ 0 \end{array}$	16 divided by 8 is 2. 16 divided by 2 is 8.
g	$7 \times 10 = 70$ $10 \times 7 = 70$	$70 \div 10 = 7$ $70 \div 7 = 10$	$\begin{array}{r} 7 \\ 10 \overline{)70} \\ \underline{70} \\ 0 \end{array}$ $\begin{array}{r} 10 \\ 7 \overline{)70} \\ \underline{70} \\ 0 \end{array}$	70 divided by 10 is 7. 70 divided by 7 is 10.
h	$6 \times 9 = 54$ $9 \times 6 = 54$	$54 \div 9 = 6$ $54 \div 6 = 9$	$\begin{array}{r} 6 \\ 9 \overline{)54} \\ \underline{54} \\ 0 \end{array}$ $\begin{array}{r} 9 \\ 6 \overline{)54} \\ \underline{54} \\ 0 \end{array}$	54 divided by 9 is 6. 54 divided by 6 is 9.
i	$9 \times 4 = 36$ $4 \times 9 = 36$	$36 \div 4 = 9$ $36 \div 9 = 4$	$\begin{array}{r} 9 \\ 4 \overline{)36} \\ \underline{36} \\ 0 \end{array}$ $\begin{array}{r} 4 \\ 9 \overline{)36} \\ \underline{36} \\ 0 \end{array}$	36 divided by 4 is 9. 36 divided by 9 is 4.
j	$6 \times 7 = 42$ $7 \times 6 = 42$	$42 \div 7 = 6$ $42 \div 6 = 7$	$\begin{array}{r} 6 \\ 7 \overline{)42} \\ \underline{42} \\ 0 \end{array}$ $\begin{array}{r} 7 \\ 6 \overline{)42} \\ \underline{42} \\ 0 \end{array}$	42 divided by 7 is 6. 42 divided by 6 is 7.

Exercise 2

Check your division facts by **quickly** doing this exercise. Check your work using the answer key at the end of the exercise.

a. $72 \div 6 =$

h. $50 \div 5 =$

o. $81 \div 9 =$

b. $12 \div 2 =$

i. $54 \div 9 =$

p. $88 \div 8 =$

c. $3 \div 1 =$

j. $8 \div 2 =$

q. $30 \div 3 =$

d. $80 \div 10 =$

k. $22 \div 11 =$

r. $12 \div 4 =$

e. $18 \div 6 =$

l. $45 \div 9 =$

s. $33 \div 3 =$

f. $40 \div 4 =$

m. $4 \div 4 =$

t. $66 \div 11 =$

g. $21 \div 7 =$

n. $24 \div 6 =$

u. $20 \div 5 =$

Answers to Exercise 2

a. 12

h. 10

o. 9

b. 6

i. 6

p. 11

c. 3

j. 4

q. 10

d. 8

k. 2

r. 3

e. 3

l. 5

s. 11

f. 10

m. 1

t. 6

g. 3

n. 4

u. 4

Exercise 3

Check your division facts by quickly doing this exercise. Check your work using the answer key at the end of the exercise.

a. $90 \div 10 =$

g. $84 \div 7 =$

m. $72 \div 9 =$

b. $70 \div 7 =$

h. $10 \div 2 =$

n. $20 \div 10 =$

c. $28 \div 7 =$

i. $64 \div 8 =$

o. $49 \div 7 =$

d. $32 \div 8 =$

j. $6 \div 6 =$

p. $48 \div 6 =$

e. $24 \div 3 =$

k. $60 \div 12 =$

q. $36 \div 9 =$

f. $36 \div 12 =$

l. $48 \div 4 =$

r. $21 \div 3 =$

Answers to Exercise 3

a. 9

g. 12

m. 8

b. 10

h. 5

n. 2

c. 4

i. 8

o. 7

d. 4

j. 1

p. 8

e. 8

k. 5

q. 4

f. 3

l. 12

r. 7

Exercise 4

Check your division facts by quickly doing this exercise. Check your work using the answer key at the end of the exercise.

a. $12 \div 6 =$

g. $55 \div 5 =$

m. $28 \div 4 =$

b. $27 \div 9 =$

h. $14 \div 7 =$

n. $6 \div 1 =$

c. $56 \div 7 =$

i. $42 \div 6 =$

o. $30 \div 5 =$

d. $3 \div 1 =$

j. $18 \div 3 =$

p. $4 \div 2 =$

e. $20 \div 2 =$

k. $88 \div 11 =$

q. $7 \div 7 =$

f. $9 \div 3 =$

l. $63 \div 9 =$

r. $48 \div 12 =$

Answers to Exercise 4

a. 2

g. 11

m. 7

b. 3

h. 2

n. 6

c. 8

i. 7

o. 6

d. 3

j. 6

p. 2

e. 10

k. 8

q. 1

f. 3

l. 7

r. 4

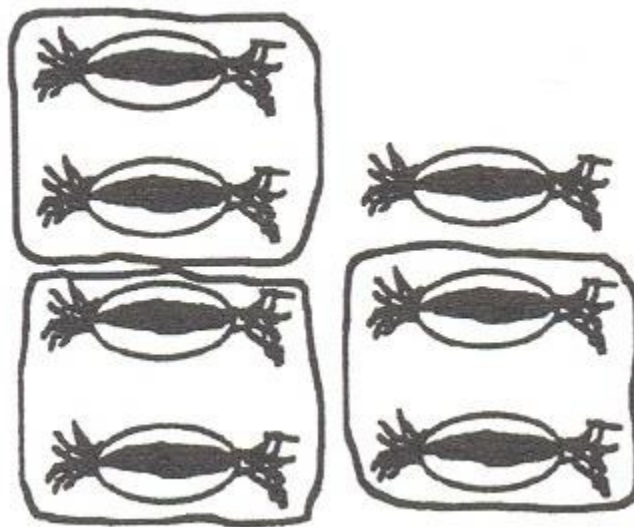
Tip: Make a list of any errors that you made and the facts that you had to really think about. If you have any more than five facts on your list, ask your instructor for suggestions on learning and drilling the division facts.

Remainders

You have been practicing the division facts that always work out evenly – nothing is left over.

Well, in the real world things are not usually so perfect!

You have 7 candies to share among your 3 children.



We call the left-over the remainder. For now, put R and the left over number after your quotient.

$$7 \div 3 = 2 \text{ R}1$$

$$\begin{array}{r} 2 \text{ R}1 \\ 3 \overline{)7} \end{array}$$

Example A

Here are 22 cookies. Circle groups of 5. How many groups of 5 in 22?



You should have 4 groups with 2 left over.

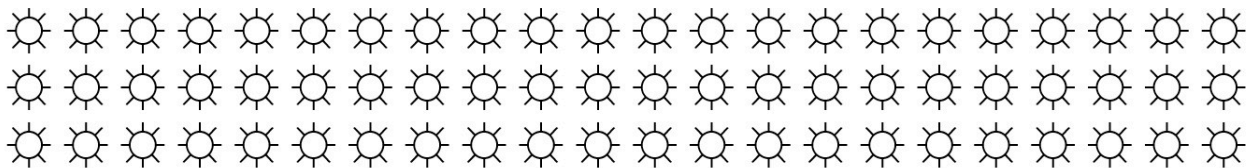
$$22 \div 5 = 4 \text{ R}2$$

$$\begin{array}{r} 4 \text{ R}2 \\ 5 \overline{)22} \end{array}$$

The remainder must not be the same size or bigger than the divisor. If it is bigger, it means another group could be made.

Example B

Here are 66 suns. Make groups of 9. How many groups of 9 in 66?



How many groups? 7

How many left over? 3

$$66 \div 9 = 7 \text{ R}3$$

$$\begin{array}{r} 7 \text{ R}3 \\ 9 \overline{)66} \end{array}$$

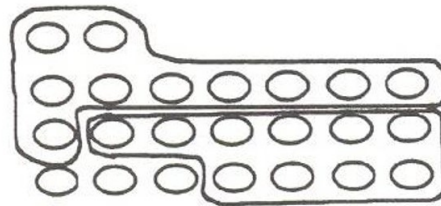
Tip: The remainder must **not** be the same size or bigger than the divisor. Why not? It would make another group.

Exercise 5

Draw pictures to find the quotient and the remainder. Write each question using the other division sign as well. Have your instructor check your work.

a. $23 \div 10 = 2 \text{ R}3$

$$\begin{array}{r} 2 \text{ R}3 \\ 10 \overline{)23} \end{array}$$



b. $24 \div 7 =$

c. $19 \div 3 =$

d. $39 \div 12 =$

You cannot always draw pictures, so how should you find the quotients?

Example C

$$29 \div 3 =$$

Use multiplication tables or the division facts to find a trial quotient. What can you multiply by 3 to find a number close to 29?

- $3 \times 9 = 27$
- $3 \times 10 = 30$

Use 9 as the trial quotient. Do not use 10 because $3 \times 10 = 30$, which is more than the dividend 29.

1. Divide.

$$\begin{array}{r} 9 \\ 3 \overline{)29} \end{array}$$

2. Multiply. $9 \times 3 = 27$. Write the product under the 29.

$$\begin{array}{r} 9 \\ 3 \overline{)29} \\ 27 \end{array}$$

3. Subtract 27 from 29 to find the remainder.

$$\begin{array}{r} 9 \\ 3 \overline{)29} \\ -27 \\ \hline 2 \end{array}$$

4. Check (compare) to be sure the remainder is less than ($<$) the divisor.
 $2 < 3$

$$29 \div 3 = 9 \text{ R}2$$

Example D

$$60 \div 7 =$$

Think what can be multiplied by 7 to find a number close to 60.

- $7 \times 8 = 56$ (good)
- $7 \times 9 = 63$ (too big)

Use 8 as the trial quotient.

1. Divide.

$$\begin{array}{r} 8 \\ 7 \overline{)60} \end{array}$$

2. Multiply.

$$\begin{array}{r} 8 \\ 7 \overline{)60} \\ 56 \end{array}$$

3. Subtract.

$$\begin{array}{r} 8 \\ 7 \overline{)60} \\ -56 \\ \hline 4 \end{array}$$

4. Compare to be sure the remainder is less than the divisor.
 $4 < 7$

$$60 \div 7 = 8 \text{ R}4$$

Exercise 6

Find the quotients and remainders (divide, multiply, subtract, compare).

a. $5 \overline{)28}$

f. $6 \overline{)25}$

k. $9 \overline{)55}$

b. $4 \overline{)15}$

g. $8 \overline{)75}$

l. $10 \overline{)98}$

c. $6 \overline{)47}$

h. $3 \overline{)19}$

m. $3 \overline{)26}$

d. $9 \overline{)37}$

i. $7 \overline{)32}$

n. $8 \overline{)47}$

e. $2 \overline{)13}$

j. $4 \overline{)9}$

o. $9 \overline{)46}$

p. $6\overline{)43}$

s. $2\overline{)19}$

v. $8\overline{)78}$

q. $5\overline{)49}$

t. $7\overline{)61}$

w. $9\overline{)67}$

r. $4\overline{)38}$

u. $3\overline{)23}$

x. $6\overline{)45}$

Answers to Exercise 6

a. 5 R3

b. 3 R3

c. 7 R5

d. 4 R1

e. 6 R1

f. 4 R1

g. 9 R3

h. 6 R1

i. 4 R4

j. 2 R1

k. 6 R1

l. 9 R8

m. 8 R2

n. 5 R7

o. 5 R1

p. 7 R1

q. 9 R4

r. 9 R2

s. 9 R1

t. 8 R5

u. 7 R2

v. 9 R6

w. 7 R4

x. 7 R3

Exercise 7

Find the quotients and remainders (divide, multiply, subtract, compare.) Check your work using the answer key at the end of the exercise.

Example

$$59 \div 7 =$$

Rewrite: $7 \overline{)59}$

$$\begin{array}{r} 8 \\ \text{Then solve: } 7 \overline{)59} \\ \underline{-56} \\ 3 \end{array}$$

Answer: 8 R3

a. $27 \div 5 =$

d. $38 \div 6 =$

g. $49 \div 8 =$

b. $13 \div 2 =$

e. $61 \div 7 =$

h. $28 \div 3 =$

c. $46 \div 9 =$

f. $14 \div 5 =$

i. $78 \div 8 =$

j. $37 \div 4 =$

o. $11 \div 3 =$

t. $11 \div 2 =$

k. $67 \div 9 =$

p. $53 \div 9 =$

u. $23 \div 5 =$

l. $52 \div 6 =$

q. $19 \div 4 =$

v. $54 \div 7 =$

m. $45 \div 8 =$

r. $77 \div 8 =$

w. $87 \div 9 =$

n. $25 \div 7 =$

s. $20 \div 3 =$

x. $9 \div 4 =$

Answers for Exercise 7

a. 5 R2

i. 9 R6

q. 4 R3

b. 6 R1

j. 9 R1

r. 9 R5

c. 5 R1

k. 7 R4

s. 6 R2

d. 6 R2

l. 8 R4

t. 5 R1

e. 8 R5

m. 5 R5

u. 4 R3

f. 2 R4

n. 3 R4

v. 7 R5

g. 6 R1

o. 3 R2

w. 9 R6

h. 9 R1

p. 5 R8

x. 2 R1

Topic A: Self-Test**Mark /12 Aim 9/12**

A. Give the answer. (6 marks)

a. $63 \div 9 =$

c. $72 \div 8 =$

e. $86 \div 4 =$

b. $21 \div 7 =$

d. $65 \div 4 =$

f. $75 \div 6 =$

B. Find the quotient. (6 marks)

a. $6 \overline{)59}$

c. $7 \overline{)51}$

e. $5 \overline{)49}$

b. $9 \overline{)87}$

d. $8 \overline{)76}$

f. $3 \overline{)26}$

Answers to Topic A Self-Test

A. Give the answer.

a. 7

c. 9

e. 8

b. 3

d. 9

f. 8

B. Find the quotient.

a. 9 R5

c. 7 R2

e. 9 R4

b. 9 R6

d. 9 R4

f. 8 R2

Topic B: Divisibility

Divisibility is when two numbers can be divided without a remainder.

For example, 18 is divisible by 3 because $18 \div 3 = 6$.

18 is not divisible by 5 because $18 \div 5 = 3$ with a remainder of 3.

Divisibility by 2

A number is divisible by 2 if it ends in 0, 2, 4, 6 or 8.

Example A

438, 540, 256, 12, and 154 are all divisible by 2 because each number ends in a 0, 2, 4, 6, or 8.

Example B

351, 945, 849, 347, and 193 are not divisible by 2 because each number does not end in a 0, 2, 4, 6 or 8.

Exercise 1

Circle the numbers that are divisible by 2. Check your work using the answer key at the end of the exercise.

a. 22

e. 274

i. 2 437

b. 35

f. 345

j. 7 548

c. 17

g. 639

k. 6 754

d. 10

h. 456

l. 5 543

Divisibility by 3

A number is divisible by 3 if the sum (total) of the digits is divisible by 3.

Example C

63

$$6 + 3 = 9$$

9 is divisible by 3, so 63 is divisible by 3.

Example D

148

$$1 + 4 + 8 = 13$$

13 is not divisible by 3, so 148 is not divisible by 3.

Example E

5 892

$$5 + 8 + 9 + 2 = 24$$

Add again: $2 + 4 = 6$

6 is divisible by 3, so 5 892 is divisible by 3.

Exercise 2

Circle the numbers that are divisible by 3. Check your work using the answer key at the end of the exercise.

a. 27

e. 274

i. 3 175

b. 35

f. 581

j. 1 458

c. 81

g. 564

k. 1 890

d. 94

h. 316

l. 3 934

Divisibility by 5

A number is divisible by 5 if the number ends in 0 or 5.

Example F

290 is divisible by 5 because it ends in 0.

Example G

132 is not divisible by 5 because it does not end in 0 or 5.

Exercise 3

Circle the numbers that are divisible by 5. Check your work using the answer key at the end of the exercise.

a. 45

e. 800

i. 6 009

b. 84

f. 753

j. 6 375

c. 72

g. 672

k. 7 020

d. 90

h. 355

l. 1 704

Answers to Exercise 1

The following numbers are divisible by 2: 22, 10, 274, 456, 7 548, 6 754.

Answers to Exercise 2

The following numbers are divisible by 3: 27, 81, 564, 1 458, 3 175, 1 890.

Answers to Exercise 3

The following numbers are divisible by 5: 45, 90, 800, 355, 6 375, 7 020.

Exercise 4

For each number, identify if it is divisible by 2, 3, and 5. Check your work using the answer key at the end of the exercise.

Number	Divisible by 2	Divisible by 3	Divisible by 5
474	Yes	Yes	No
615			
412			
865			
300			
831			
525			
350			
710			
429			
906			
634			
430			
275			

Answers to Exercise 4

Number	Divisible by 2	Divisible by 3	Divisible by 5
474	Yes	Yes	No
615	No	Yes	Yes
412	Yes	No	No
865	No	No	Yes
300	Yes	Yes	Yes
831	No	Yes	No
525	No	Yes	Yes
350	Yes	No	Yes
710	Yes	No	Yes
429	No	Yes	No
906	Yes	Yes	No
634	Yes	No	No
430	Yes	No	Yes
275	No	No	Yes

Exercise 5

For each number, identify if it is divisible by 2, 3, and 5. Check your work using the answer key at the end of the exercise.

Number	Divisible by 2	Divisible by 3	Divisible by 5
3 585			
7 548			
5 890			
6 318			
3 905			
5 280			
1 760			
8 007			
6 752			
7 375			
5 523			
2 625			
8 956			
9 150			

Answers to Exercise 5

Number	Divisible by 2	Divisible by 3	Divisible by 5
3 585	No	Yes	Yes
7 548	Yes	Yes	No
5 890	Yes	No	Yes
6 318	Yes	Yes	No
3 905	No	No	Yes
5 280	Yes	Yes	Yes
1 760	Yes	No	Yes
8 007	No	Yes	No
6 752	Yes	No	No
7 375	No	No	Yes
5 523	No	Yes	No
2 625	No	Yes	Yes
8 956	Yes	No	No
9 150	Yes	Yes	Yes

Divisibility by 9

A number is divisible by 9 if the sum (total) of the digits is divisible by 9.

Example H

135

$$1 + 3 + 5 = 9$$

9 is divisible by 9, so 135 is divisible by 9.

Example I

7 578

$$7 + 5 + 7 + 8 = 27$$

27 is divisible by 9, so 7 578 is divisible by 9.

Example J

57 896

$$5 + 7 + 8 + 9 + 6 = 35$$

35 is not divisible by 9, so 57 896 is not divisible by 9.

Exercise 6

Circle the numbers that are divisible by 9. Check your work using the answer key at the end of the exercise.

a. 538

e. 6 213

i. 34 937

b. 783

f. 5 742

j. 39 402

c. 954

g. 7 083

k. 74 124

d. 762

h. 5 738

l. 45 683

Answers to Exercise 6

The following numbers are divisible by 9: 783, 954, 5 742, 7 083, 39 402, 74 124.

Exercise 7

For each number, identify if it is divisible by 2, 3, 5, and 9. Check your work using the answer key at the end of the exercise.

Number	Divisible by 2	Divisible by 3	Divisible by 5	Divisible by 9
453				
320				
216				
726				
712				
425				
630				
375				
990				

Answers to Exercise 7

Number	Divisible by 2	Divisible by 3	Divisible by 5	Divisible by 9
453	No	Yes	No	No
320	Yes	No	Yes	No
216	Yes	Yes	No	Yes
726	Yes	Yes	No	No
712	Yes	No	No	No
425	No	No	Yes	No
630	Yes	Yes	Yes	Yes
375	No	Yes	Yes	No
990	Yes	Yes	Yes	Yes

Exercise 8

For each number, identify if it is divisible by 2, 3, 5, and 9.

Number	Divisible by 2	Divisible by 3	Divisible by 5	Divisible by 9
837				
360				
648				
981				
465				
1 002				
3 520				
6 435				
8 022				

Answers to Exercise 8

Number	Divisible by 2	Divisible by 3	Divisible by 5	Divisible by 9
837	No	Yes	No	Yes
360	Yes	Yes	Yes	Yes
648	Yes	Yes	No	Yes
981	No	Yes	No	Yes
465	No	Yes	Yes	No
1 002	Yes	Yes	No	No
3 520	Yes	No	Yes	No
6 435	No	Yes	Yes	Yes
8 022	Yes	Yes	No	No

Exercise 9

For each number, identify if it is divisible by 2, 3, 5, and 9.

Number	Divisible by 2	Divisible by 3	Divisible by 5	Divisible by 9
1 200				
7 164				
3 681				
8 205				
2 745				
4 320				
7 350				
4 000				
1 368				

Answers to Exercise 9

Number	Divisible by 2	Divisible by 3	Divisible by 5	Divisible by 9
1 200	Yes	Yes	Yes	No
7 164	Yes	Yes	No	Yes
3 681	No	Yes	No	Yes
8 205	No	Yes	Yes	No
2 745	No	Yes	Yes	Yes
4 320	Yes	Yes	Yes	Yes
7 350	Yes	Yes	Yes	No
4 000	Yes	No	Yes	No
1 368	Yes	Yes	No	Yes

Topic B: Self-Test

Mark /12 **Aim 9/12**

A. From the list of numbers, write the numbers that are divisible by the specified number.

48	925	1 467	2 645	5 534	7 512	31 183
			52 361			

- Which numbers are divisible by 2?
- Which numbers are divisible by 3?
- Which numbers are divisible by 5?
- Which numbers are divisible by 9?

B. For each number, identify if it is divisible by 2, 3, 5, and 9.

Number	Divisible by 2	Divisible by 3	Divisible by 5	Divisible by 9
1 200				
7 164				
3 681				
8 205				
2 745				

Answers to Topic B Self Test

A. From the list of numbers, write the numbers that are divisible by the specified number.

- a. 48, 7 512, 5 534
- b. 48, 1 467, 7 512
- c. 925, 2 645
- d. 1 467

B. For each number, identify if it is divisible by 2, 3, 5, and 9.

Number	Divisible by 2	Divisible by 3	Divisible by 5	Divisible by 9
1 200	Yes	Yes	Yes	No
7 164	Yes	Yes	No	Yes
3 681	No	Yes	No	Yes
8 205	No	Yes	Yes	No
2 745	No	Yes	Yes	Yes

Topic C: Dividing Larger Numbers by One-Digit Divisors

Several methods are used to divide larger numbers. This book will only teach one method. If you have learned a different method for dividing, ask your instructor to review it with you. You can use the practice exercises in this workbook using whichever method you prefer.

One-Digit Divisors without Remainders

Division has four steps which are repeated until the dividend is completely divided. Work through the three examples which show these steps.

1. Divide.
2. Multiply
3. Subtract and compare the remainder to the divisor.
4. Bring down the next digit in the dividend and repeat.

Example A

$$294 \div 7 =$$

Rewrite as $7 \overline{)294}$

Step 1: Divide.

Find a trial quotient using multiplication tables or division facts.

Look at the dividend one digit at a time.

- i. The first digit is a 2, which is really 2 hundreds.
- ii. Will 7 go into 2? Can you divide 2 by 7? No.
- iii. Look at the first 2 digits, 29, which is really 29 tens.
- iv. Will 7 go into 29? Yes. $4 \times 7 = 28$.

$$\begin{array}{r} 4 \\ 7 \overline{)294} \end{array}$$

The first number in the quotient is 4. Place the 4 in the quotient directly above the 9 tens. The 4 is 4 tens in the quotient.

Step 2: Multiply.

Multiply $4 \times 7 = 28$.

Write the 28 under the 29. Draw a line.

$$\begin{array}{r} 4 \\ 7 \overline{)294} \\ \underline{28} \end{array}$$

Step 3: Subtract.

Subtract $29 - 28 = 1$ (ten).

Check $1 < 7$.

$$\begin{array}{r} 4 \\ 7 \overline{)294} \\ \underline{-28} \\ 1 \end{array}$$

Step 4: Bring down the next number in the dividend.

Bring down the next number in the dividend (4), and put it beside the result of the subtraction you just completed (1).

Together, they make 14. This 14 is the number that you must now divide.

$$\begin{array}{r} 4 \\ 7 \overline{)294} \\ -28 \\ \hline 14 \end{array}$$

Repeat Step 1: Divide.

- Divide $14 \div 7 = 2$
- Put the 2 in the quotient right after the 4 in the ones place.

$$\begin{array}{r} 42 \\ 7 \overline{)294} \\ -28 \\ \hline 14 \end{array}$$

Repeat Step 2: Multiply.

- Multiply $2 \times 7 = 14$.
- Write the 14 under the 14. Draw a line.

$$\begin{array}{r} 42 \\ 7 \overline{)294} \\ -28 \\ \hline 14 \\ 14 \\ \hline \end{array}$$

Repeat Step 3: Subtract.

- Subtract $14 - 14 = 0$. There is 0 remainder.
- Check $0 < 7$.

$$\begin{array}{r} 42 \\ 7 \overline{)294} \\ -28 \\ \hline 14 \\ -14 \\ \hline 0 \end{array}$$

There are no more numbers in the dividend to bring down, so you are done.

$$294 \div 7 = 42$$

Example B

$$128 \div 2 =$$

$$\begin{array}{r} 64 \\ 2 \overline{)128} \\ \underline{-12} \\ 08 \\ \underline{-8} \\ 0 \end{array}$$

Step 1: Divide.

- a. Can 2 go into 1? No.
- b. Can 2 go into 12? Yes.
- c. How many times?
 - $2 \times 6 = 12$; $12 \div 2 = 6$
- d. The first number in the trial quotient is 6. Put the 6 in the quotient directly above the 2 tens dividend.

Step 2: Multiply.

- a. $6 \times 2 = 12$.
- b. Write the 12 under the 12. Draw a line.

Step 3: Subtract.

- a. $12 - 12 = 0$
- b. Check $0 < 12$

Step 4: Bring down the next number in the dividend.

- a. Bring down the next number in the dividend (8), and put it beside the result of the subtraction you just completed (0).
- b. 8 is now the number to be divided.

Repeat

1. Divide: $8 \div 2 = 4$
2. Multiple: $4 \times 2 = 8$
3. Subtract: $8 - 8 = 0$
 - a. Check $0 < 2$
4. Bring down the next digit. There are no more digits in the dividend.

$$128 \div 2 = 64$$

Exercise 1

Find the quotients (divide, multiply, subtract, compare). Check your work using the answer key at the end of the exercise.

a. $4 \overline{)364}$

e. $8 \overline{)144}$

i. $5 \overline{)230}$

b. $2 \overline{)144}$

f. $2 \overline{)166}$

j. $8 \overline{)584}$

c. $5 \overline{)455}$

g. $7 \overline{)588}$

k. $6 \overline{)366}$

d. $7 \overline{)651}$

h. $2 \overline{)196}$

l. $4 \overline{)244}$

m. $5 \overline{)375}$

q. $9 \overline{)837}$

u. $5 \overline{)295}$

n. $8 \overline{)200}$

r. $8 \overline{)248}$

v. $6 \overline{)384}$

o. $2 \overline{)628}$

s. $8 \overline{)312}$

w. $2 \overline{)276}$

p. $7 \overline{)357}$

t. $7 \overline{)462}$

x. $4 \overline{)372}$

Answers to Exercise 1

a. 91

i. 46

q. 93

b. 72

j. 73

r. 31

c. 91

k. 61

s. 39

d. 93

l. 61

t. 66

e. 18

m. 75

u. 59

f. 83

n. 25

v. 64

g. 84

o. 314

w. 138

h. 98

p. 51

x. 93

Example C

$$856 \div 8 =$$

$$8 \overline{)856}$$

Divide

Does 8 go into 8? Yes. $8 \div 8 = 1$.

$$\begin{array}{r} 1 \\ 8 \overline{)856} \end{array}$$

Multiply

$$1 \times 8 = 8$$

$$\begin{array}{r} 1 \\ 8 \overline{)856} \\ 8 \end{array}$$

Subtract

$8 - 8 = 0$. Check $0 < 8$.

$$\begin{array}{r} 1 \\ 8 \overline{)856} \\ -8 \\ \hline 0 \end{array}$$

Bring down the next digit

5 is now the number to be divided.

$$\begin{array}{r} 1 \\ 8 \overline{)856} \\ -8 \\ \hline 05 \end{array}$$

Now repeat.

Divide

Does 8 go into 5? No.

You must put a zero to hold the place in the quotient. If a digit is brought down, a digit must be placed in the quotient.

$$\begin{array}{r} 10 \\ 8 \overline{)856} \\ -8 \\ \hline 05 \end{array}$$

Multiply

$$0 \times 8 = 0$$

$$\begin{array}{r} 10 \\ 8 \overline{)856} \\ -8 \\ \hline 05 \\ -0 \\ \hline \end{array}$$

Subtract

$$5 - 0 = 5. \text{ Check } 5 < 8.$$

$$\begin{array}{r} 10 \\ 8 \overline{)856} \\ -8 \\ \hline 05 \\ -0 \\ \hline 5 \end{array}$$

Bring down the next digit

56 is now the number to be divided.

$$\begin{array}{r} 10 \\ 8 \overline{)856} \\ -8 \\ \hline 05 \\ -0 \\ \hline 56 \end{array}$$

Now repeat.

Divide

Does 8 go into 56? Yes. $56 \div 8 = 7$.

Write 7 in the quotient in the ones place above the 6 in the dividend.

$$\begin{array}{r} 107 \\ 8 \overline{)856} \\ \underline{-8} \\ 05 \\ \underline{-0} \\ 56 \end{array}$$

Multiply

$$7 \times 8 = 56$$

$$\begin{array}{r} 107 \\ 8 \overline{)856} \\ \underline{-8} \\ 05 \\ \underline{-0} \\ 56 \\ \underline{56} \\ 0 \end{array}$$

Subtract

$$56 - 56 = 0. \text{ Check } 0 < 8.$$

$$\begin{array}{r} 107 \\ 8 \overline{)856} \\ \underline{-8} \\ 05 \\ \underline{-0} \\ 56 \\ \underline{-56} \\ 0 \end{array}$$

Bring down the next digit.

No more digits.

$$856 \div 8 = 107$$

Exercise 2

Find the quotients (divide, multiply, subtract, compare). Check your work using the answer key at the end of the exercise.

a. $7 \overline{)721}$

f. $9 \overline{)972}$

k. $8 \overline{)832}$

b. $9 \overline{)954}$

g. $7 \overline{)714}$

l. $4 \overline{)436}$

c. $3 \overline{)927}$

h. $2 \overline{)416}$

m. $5 \overline{)515}$

d. $3 \overline{)621}$

i. $5 \overline{)540}$

n. $2 \overline{)814}$

e. $4 \overline{)824}$

j. $6 \overline{)654}$

o. $6 \overline{)648}$

p. $8\overline{)856}$

s. $9\overline{)945}$

v. $4\overline{)416}$

q. $5\overline{)525}$

t. $3\overline{)315}$

w. $6\overline{)618}$

r. $7\overline{)763}$

u. $8\overline{)872}$

x. $2\overline{)612}$

Answers to Exercise 2

a. 103

b. 106

c. 309

d. 207

e. 206

f. 108

g. 102

h. 208

i. 108

j. 109

k. 104

l. 109

m. 103

n. 407

o. 108

p. 107

q. 105

r. 109

s. 105

t. 105

u. 109

v. 104

w. 103

x. 306

One-Digit Divisors with Remainders

Do the division exactly the same way that you have been learning. Often there is a remainder after the last subtraction. Write it with the quotient as you already know how to do.

Example D

$$259 \div 8 =$$

$$\begin{array}{r} 32 \text{ R}3 \\ 8 \overline{)259} \\ \underline{-24} \\ 19 \\ \underline{-16} \\ 3 \end{array}$$

$$259 \div 8 = 32 \text{ R}3$$

Exercise 3

Divide and show any remainders. Check your work using the answer key at the end of the exercise.

a. $2 \overline{)93}$

c. $5 \overline{)94}$

e. $4 \overline{)95}$

b. $3 \overline{)52}$

d. $7 \overline{)74}$

f. $9 \overline{)96}$

g. $6\overline{)97}$

m. $7\overline{)96}$

s. $5\overline{)67}$

h. $8\overline{)99}$

n. $5\overline{)57}$

t. $2\overline{)85}$

i. $9\overline{)98}$

o. $2\overline{)47}$

u. $4\overline{)71}$

j. $4\overline{)59}$

p. $8\overline{)91}$

v. $3\overline{)65}$

k. $6\overline{)76}$

q. $7\overline{)89}$

w. $9\overline{)92}$

l. $3\overline{)79}$

r. $6\overline{)82}$

x. $8\overline{)94}$

Answers to Exercise 3

- | | | |
|----------|----------|----------|
| a. 46 R1 | i. 10 R8 | q. 12 R5 |
| b. 17 R1 | j. 14 R3 | r. 13 R4 |
| c. 18 R4 | k. 12 R4 | s. 13 R2 |
| d. 10 R4 | l. 26 R1 | t. 42 R1 |
| e. 23 R3 | m. 13 R5 | u. 17 R3 |
| f. 10 R6 | n. 11 R2 | v. 21 R2 |
| g. 16 R1 | o. 23 R1 | w. 10 R2 |
| h. 12 R3 | p. 11 R3 | x. 11 R6 |

Check Division by Multiplying

To check your division, do this:

1. Multiply the quotient by the divisor.
2. Add on any remainder.

The product will equal the dividend if your arithmetic is correct.

Example E

$$\begin{array}{r}
 52 \text{ R}1 \\
 9 \overline{)469} \\
 \underline{-45} \\
 19 \\
 \underline{-18} \\
 1
 \end{array}
 \qquad
 \begin{array}{r}
 52 \\
 \times 9 \\
 \hline
 468
 \end{array}
 \qquad
 468 + 1 = 469$$

Exercise 4

Divide and check your answer by multiplying. Check your work using the answer key at the end of the exercise.

a. $7\overline{)709}$

f. $6\overline{)125}$

k. $8\overline{)301}$

b. $2\overline{)423}$

g. $3\overline{)605}$

l. $2\overline{)807}$

c. $5\overline{)538}$

h. $9\overline{)928}$

m. $6\overline{)725}$

d. $4\overline{)609}$

i. $3\overline{)962}$

n. $7\overline{)320}$

e. $9\overline{)406}$

j. $4\overline{)805}$

o. $9\overline{)140}$

p. $8 \overline{)483}$

s. $5 \overline{)504}$

v. $4 \overline{)101}$

q. $2 \overline{)197}$

t. $8 \overline{)709}$

w. $3 \overline{)269}$

r. $6 \overline{)307}$

u. $7 \overline{)876}$

x. $5 \overline{)473}$

Answers to Exercise 4

a. 101 R2

b. 211 R1

c. 107 R3

d. 152 R1

e. 45 R1

f. 20 R5

g. 201 R2

h. 103 R1

i. 320 R2

j. 201 R1

k. 37 R5

l. 403 R1

m. 120 R5

n. 45 R5

o. 15 R5

p. 60 R3

q. 98 R1

r. 51 R1

s. 100 R4

t. 88 R5

u. 125 R1

v. 25 R1

w. 89 R2

x. 94 R3

Topic C: Self-Test

Mark /24 Aim 19/24

A. Find the quotient. (6 marks)

a. $6\overline{)96}$

c. $7\overline{)91}$

e. $5\overline{)94}$

b. $4\overline{)92}$

d. $2\overline{)93}$

f. $3\overline{)52}$

B. Divide. (6 marks)

a. $7\overline{)182}$

c. $6\overline{)162}$

e. $4\overline{)184}$

b. $8\overline{)736}$

d. $5\overline{)295}$

f. $9\overline{)576}$

C. Divide and show your check for each answer (12 marks – 1 mark for question, 1 mark for check).

a. $9\overline{)705}$

c. $7\overline{)899}$

e. $8\overline{)876}$

b. $4\overline{)257}$

d. $5\overline{)538}$

f. $6\overline{)628}$

Answers to Topic C Self-Test

A. Find the quotient.

a. 16

c. 13

e. 18 R4

b. 23

d. 46 R1

f. 17 R1

B. Divide.

a. 26

c. 27

e. 46

b. 92

d. 59

f. 64

C. Divide and show your check for each answer.

a. 78 R3

c. 128 R3

e. 109 R4

b. 64 R1

d. 107 R3

f. 104 R4

Topic D: Dividing by Two and Three Digit Divisors

Finding Trial Quotients:

When dividing by 2-digit numbers, you will need to estimate the quotient. This guess is called a trial quotient.

Example A

$$624 \div 24$$

Rewrite as $24 \overline{)624}$

Step 1: Divide

- a. Think: $2 \overline{)6}$ is 3. So $24 \overline{)62}$ is about 3.

Step 2: Multiply and subtract.

a.
$$\begin{array}{r} 3 \\ 24 \overline{)624} \\ \underline{72} \end{array}$$

- b. Since $72 > 62$, 3 is too large.

Step 3: Try a smaller number, multiply and subtract.

a.
$$\begin{array}{r} 2 \\ 24 \overline{)624} \\ \underline{48} \\ 14 \end{array}$$

- b. Since $4 < 24$, 2 is correct.

Step 4: Finish the problem.

Example B

$$630 \div 15$$

Rewrite as $15 \overline{)630}$

Step 1: Divide

a. 15 rounds to 20. Think: $2 \overline{)6}$ is 3. So $15 \overline{)63}$ is about 3.

Step 2: Multiply and subtract.

$$\begin{array}{r} 3 \\ 15 \overline{)630} \\ \underline{45} \\ 18 \end{array}$$

b. Since $18 > 15$, 3 is too small.

Step 3: Try a larger number, multiply and subtract.

$$\begin{array}{r} 4 \\ 24 \overline{)630} \\ \underline{60} \\ 3 \end{array}$$

b. Since $3 < 15$, 4 is correct.

Step 4: Finish the problem.

Exercise 1

In each question, the trial quotient is either too large or too small. Multiply. Write too large or too small on the line. Then, write the correct trial quotient beside. Check your work using the answer key at the end of the exercise.

$$\text{a. } \begin{array}{r} 2 \\ 25 \overline{)475} \end{array}$$

$$\text{b. } \begin{array}{r} 3 \\ 15 \overline{)682} \end{array}$$

$$\text{c. } \begin{array}{r} 5 \\ 18 \overline{)813} \end{array}$$

d.
$$\begin{array}{r} 2 \\ 25 \overline{)810} \end{array}$$

i.
$$\begin{array}{r} 3 \\ 25 \overline{)650} \end{array}$$

n.
$$\begin{array}{r} 4 \\ 18 \overline{)648} \end{array}$$

e.
$$\begin{array}{r} 3 \\ 33 \overline{)891} \end{array}$$

j.
$$\begin{array}{r} 4 \\ 34 \overline{)176} \end{array}$$

o.
$$\begin{array}{r} 4 \\ 27 \overline{)946} \end{array}$$

f.
$$\begin{array}{r} 3 \\ 18 \overline{)819} \end{array}$$

k.
$$\begin{array}{r} 4 \\ 12 \overline{)420} \end{array}$$

p.
$$\begin{array}{r} 3 \\ 23 \overline{)943} \end{array}$$

g.
$$\begin{array}{r} 3 \\ 27 \overline{)727} \end{array}$$

l.
$$\begin{array}{r} 2 \\ 43 \overline{)801} \end{array}$$

q.
$$\begin{array}{r} 3 \\ 24 \overline{)578} \end{array}$$

h.
$$\begin{array}{r} 2 \\ 35 \overline{)652} \end{array}$$

m.
$$\begin{array}{r} 3 \\ 31 \overline{)899} \end{array}$$

r.
$$\begin{array}{r} 2 \\ 29 \overline{)406} \end{array}$$

$$\text{s. } \begin{array}{r} 2 \\ 48 \overline{)892} \end{array}$$

$$\text{u. } \begin{array}{r} 3 \\ 37 \overline{)939} \end{array}$$

$$\text{t. } \begin{array}{r} 2 \\ 28 \overline{)534} \end{array}$$

$$\text{v. } \begin{array}{r} 2 \\ 28 \overline{)854} \end{array}$$

Answers to Exercise 1

- a. too large, 1
- b. too small, 4
- c. too large, 4
- d. too small, 3
- e. too large, 2
- f. too small, 4
- g. too large, 2
- h. too large, 1

- i. too large, 2
- j. too small, 5
- k. too large, 3
- l. too large, 1
- m. too large, 2
- n. too large, 3
- o. too large, 3
- p. too small, 4

- q. too large, 2
- r. too large, 1
- s. too large, 1
- t. too large, 1
- u. too large, 2
- v. too small, 3

Example C

$$78 \overline{)2706}$$

Since 78 rounds to 80, think $8 \overline{)27}$. 8 goes into 27 \approx 3. 3 would be a good trial quotient.

$$\begin{array}{r} 3 \\ 78 \overline{)2706} \\ \underline{234} \\ 36 \end{array}$$

Since $36 < 78$, 3 is a good trial quotient.

Example D

$$27 \overline{)2205}$$

Since 27 rounds to 30, think $3 \overline{)22}$. 3 goes into 22 \approx 7. 7 would be a good trial quotient.

$$\begin{array}{r} 7 \\ 27 \overline{)2205} \\ \underline{189} \\ 31 \end{array}$$

Since $31 > 27$, so 7 is too small. A better trial quotient would be 8.

Exercise 2

Find the first digit in the trial quotient. Check your work using the answer key at the end of the exercise.

a. $43 \overline{)1772}$ $4 \overline{)17}$.1 < 4

$$\begin{array}{r} 4 \\ 4 \overline{)17} \\ \underline{16} \\ 1 \end{array}$$

c. $28 \overline{)6008}$

f. $75 \overline{)2420}$

d. $33 \overline{)2731}$

g. $54 \overline{)3316}$

b. $64 \overline{)3276}$

e. $59 \overline{)4164}$

h. $38 \overline{)2759}$

i. $46 \overline{)387}$

o. $86 \overline{)2089}$

u. $16 \overline{)8640}$

j. $35 \overline{)3316}$

p. $26 \overline{)1417}$

v. $45 \overline{)3060}$

k. $83 \overline{)7237}$

q. $72 \overline{)1462}$

w. $38 \overline{)2158}$

l. $77 \overline{)6763}$

r. $27 \overline{)6939}$

x. $42 \overline{)1491}$

m. $93 \overline{)3724}$

s. $32 \overline{)7840}$

n. $52 \overline{)4690}$

t. $24 \overline{)7605}$

Answers to Exercise 2

a. 4	i. 8	q. 2
b. 5	j. 9	r. 2
c. 2	k. 8	s. 2
d. 8	l. 8	t. 3
e. 7	m. 4	u. 5
f. 3	n. 9	v. 6
g. 6	o. 2	w. 5
h. 7	p. 5	x. 3

Two Digit Divisors

Dividing by large divisors is a challenge!

You must **estimate** how many times one number will divide into another. Use pencil and have an eraser close by when you do these questions. You will use the same steps that you already know.

Example E

$$964 \div 75 =$$

Step 1: Divide

1. Does 75 go into 9? **NO**
2. Does 75 go into 96? **YES**
3. Estimate
 1. Round 75 to 80 – think “8”
 2. Round 96 to 100 – think “10”
 3. How many 8’s in 10? Just 1.
 4. The estimate for the first digit in the trial quotient is 1.
4. Write **1** in the quotient above the 6 tens.

$$\begin{array}{r} 1 \\ 75 \overline{)964} \end{array}$$

Step 2: Multiply

$$1 \times 75 = 75$$

1. Write 75 under 96.

$$\begin{array}{r} 1 \\ 75 \overline{)964} \\ \underline{75} \end{array}$$

Step 3: Subtract

$$96 - 75 = 21$$

1. Check $21 < 75$? **YES!**

$$\begin{array}{r} 1 \\ 75 \overline{)964} \\ \underline{75} \\ 21 \end{array}$$

Step 4: Bring down the next digit from the dividend. Now divide 214.

$$\begin{array}{r} 1 \\ 75 \overline{)964} \\ \underline{75 \downarrow} \\ 214 \end{array}$$

REPEAT**Step 1: Divide**

1. Does 75 go into 214? **YES**
2. Estimate 75 as 80 – think “8”
 1. Estimate 214 as 200 – think “20”
 2. 8 goes into 20 2 times ($8 \times 2 = 16$, so $20 \div 8 = 2$)
3. The estimate for the second digit in the trial quotient is 2. Write 2 in the quotient

above the 4 in the dividend.

$$\begin{array}{r} 12 \\ 75 \overline{)964} \\ \underline{75 } \\ 214 \end{array}$$

Step 2: Multiply

$$2 \times 75 = 150$$

1. Write 150 under the 214.

$$\begin{array}{r} 12 \\ 75 \overline{)964} \\ \underline{75 } \\ 214 \\ \underline{150} \end{array}$$

Step 3: Subtract and check that the remainder is less than the divisor.

$$\begin{array}{r} 12 \\ 75 \overline{)964} \\ \underline{75 } \\ 214 \\ \underline{150} \\ 64 \end{array}$$

Step 4: Bring down – no more digits in dividend.

To check your answer

$$\begin{array}{r}
 75 \\
 \times 12 \\
 \hline
 150 \\
 750 \\
 \hline
 900 \\
 + 64 \\
 \hline
 964
 \end{array}$$

Exercise 3

Carefully divide these questions. Be careful to keep the hundreds in line with the hundreds, the tens with the tens, and so on. You might want to use squared paper for long division.

If you are having **any** difficulty, ask your instructor to watch you doing a few questions to be sure you are using a correct method.

a. $10 \overline{)720}$

d. $22 \overline{)946}$

g. $62 \overline{)2528}$

b. $12 \overline{)564}$

e. $32 \overline{)1632}$

h. $71 \overline{)2414}$

c. $21 \overline{)882}$

f. $23 \overline{)943}$

i. $24 \overline{)7578}$

j. $82 \overline{)2958}$

m. $19 \overline{)9595}$

p. $24 \overline{)9648}$

k. $18 \overline{)6250}$

n. $47 \overline{)3854}$

q. $49 \overline{)1312}$

l. $25 \overline{)1550}$

o. $58 \overline{)6500}$

r. $67 \overline{)7683}$

Answers to Exercise 3

a. 72

b. 47

c. 42

d. 43

e. 51

f. 41

g. 40 R48

h. 34

i. 315 R18

j. 36 R6

k. 347 R4

l. 62

m. 505

n. 82

o. 112 R4

p. 402

q. 26 R38

r. 114 R45

If the estimate for your trial quotient is too large the result of the multiplication will be larger than the numbers in the dividend.

1. **Divide:** Trial estimate is 4.

2. **Multiply:**

1. $4 \times 23 = 92$

2. 92 is larger than 78, so 4 is too large an estimate. Erase it. Try 3.

$3 \times 23 = 69$

3. 3 is the correct estimate and you can complete the division.

1.	$23 \overline{)784}$
2.	$\begin{array}{r} 4 \\ 23 \overline{)784} \\ \underline{92} \end{array}$
3.	$\begin{array}{r} 34 \text{ R}2 \\ 23 \overline{)784} \\ \underline{69 \downarrow} \\ 94 \\ \underline{92} \\ 2 \end{array}$

If the estimate is too small, the result of the subtraction will be larger than the divisor.

1. **Divide:** Trial estimate is 5.
2. **Multiply:** $5 \times 72 = 360$
3. **Subtract:**
 1. $448 - 72 = 360$
 2. Check $88 < 72$? **NO**, 88 is greater than 72.
 3. So 5 is too small. Erase it and use a larger number. 6 will be a better estimate.
4. **Divide:** $448 \div 72 \approx 6$
5. **Multiply:** $6 \times 72 = 432$
6. **Subtract:**
 1. $448 - 432 = 16$
 2. Check $16 < 72$? **YES!**
7. **Bring down the next digit** and complete the division.

1.	$72 \overline{)4487}$
2.	$\begin{array}{r} 5 \\ 72 \overline{)4487} \\ \underline{360} \\ 88 \end{array}$
3.	$\begin{array}{r} 62 \text{ R}23 \\ 72 \overline{)4487} \\ \underline{432 \downarrow} \\ 167 \\ \underline{144} \\ 23 \end{array}$

Exercise 4

Divide and check your work by multiplying. Check your work using the answer key at the end of the exercise.

a. $18 \overline{)648}$

f. $94 \overline{)8126}$

k. $79 \overline{)2765}$

b. $26 \overline{)6766}$

g. $20 \overline{)4060}$

l. $42 \overline{)8442}$

c. $52 \overline{)1968}$

h. $47 \overline{)1728}$

m. $57 \overline{)9144}$

d. $84 \overline{)8640}$

i. $33 \overline{)1886}$

n. $96 \overline{)20160}$

e. $72 \overline{)2883}$

j. $25 \overline{)5750}$

o. $75 \overline{)23550}$

Answers to Exercise 4

- | | | |
|------------|-----------|------------|
| a. 36 | f. 86 R42 | k. 35 |
| b. 260 R6 | g. 203 | l. 201 |
| c. 37 R44 | h. 36 R36 | m. 160 R24 |
| d. 102 R72 | i. 57 R5 | n. 210 |
| e. 40 R3 | j. 230 | o. 314 |

Dividing by 10, 100, 1000...

What is the pattern? When you divide by 10

1. The ones digit in the dividend becomes the remainder.

$$10 \overline{)324} = 32R4$$

2. The other numbers in the dividend stay the same but each digit is one place value less.
 - the hundreds become tens
 - the tens become ones
 - the ones become the remainder

Exercise 5

Find the quotients. Look for the pattern. Check your work using the answer key at the end of the exercise.

a. $10\overline{)46}$

d. $10\overline{)832}$

g. $10\overline{)2457}$

b. $10\overline{)75}$

e. $10\overline{)674}$

h. $10\overline{)3685}$

c. $10\overline{)136}$

f. $10\overline{)952}$

Answers to Exercise 5

a. 4 R6

d. 83 R2

g. 245 R7

b. 7 R5

e. 67 R4

h. 368 R5

c. 13 R6

f. 95 R2

When you divide by 100

1. The ones and tens digits in the dividend become the remainder.
2. The other digits in the dividend stay the same but each digit is **two** places less.
 - the thousands become tens
 - the hundreds become ones
 - the tens and ones become the remainder

Exercise 6

Find these quotients. Look for the pattern when you divide. Check your work using the answer key at the end of the exercise

a. $100 \overline{)386}$

d. $100 \overline{)175}$

g. $100 \overline{)92045}$

b. $100 \overline{)995}$

e. $100 \overline{)2948}$

h. $100 \overline{)43821}$

c. $100 \overline{)269}$

f. $100 \overline{)4671}$

Answers to Exercise 6

a. 3 R86

d. 1 R75

g. 920 R45

b. 9 R95

e. 29 R48

h. 438 R21

c. 2 R69

f. 46 R71

When you divide by 1000

1. The ones, tens, and hundreds digits become the remainder.
2. The other digits stay the same but are **three** place values less.
 - thousands become ones
 - ten thousands become tens
 - hundred thousands become hundreds

Exercise 7

Try these. Check your work using the answer key at the end of the exercise.

a. $1000 \overline{)2398}$

c. $1000 \overline{)4835}$

e. $1000 \overline{)82405}$

b. $1000 \overline{)6475}$

d. $1000 \overline{)63291}$

f. $1000 \overline{)293591}$

Answers to Exercise 7

a. 2 R398

c. 4 R835

e. 82 R405

b. 6 R475

d. 63 R291

f. 293 R591

Three Digit Divisors

If the divisor has three digits, use the method you know for two-digit divisors, but estimate the divisor to the nearest hundred to find the trial quotient. Be very **careful** to put the first digit in the quotient in the correct place.

Example F

$$17\,902 \div 381 =$$

Step 1: Divide

1. Does 381 go into 1? NO
2. Does 381 go into 17? NO
3. Does 381 go into 179? NO
4. Does 381 go into 1 790? YES
5. Estimate 381 as 400. Think 4.
6. Estimate 1 790 as 1 800. Think 18.
7. 4 goes into 18 \approx 4 times ($4 \times 4 = 16$)
8. Your estimate is 4. Write 4 in the quotient above the 0 in the dividend.

$$\begin{array}{r} 4 \\ 381 \overline{)17902} \end{array}$$

Step 2: Multiply

1. $4 \times 381 = 1\,524$

$$\begin{array}{r} 4 \\ 381 \overline{)17902} \\ \underline{1524} \end{array}$$

Step 3: Subtract

1. $1\,790 - 1\,524 = 266$
2. Check $266 < 381$? YES!

$$\begin{array}{r} 4 \\ 381 \overline{)17902} \\ \underline{1524} \\ 266 \end{array}$$

Step 4: Bring down the 2. 2 662 is now the number to be divided

$$\begin{array}{r} 4 \\ 381 \overline{)17902} \\ \underline{1524 \downarrow} \\ 2662 \end{array}$$

REPEAT

Step 1: Divide $2662 \div 381 =$

1. Estimate 381 as 400. Think of 4.
2. Estimate 2 662 as 2 700. Think 27.
3. 4 goes into 27 \approx 6 times ($4 \times 6 = 24$).
4. Place this estimate in the quotient above the 2

$$\begin{array}{r} 4 \\ 381 \overline{)17902} \\ \underline{1524 \downarrow} \\ 2662 \end{array}$$

Step 2: Multiply

1. $6 \times 381 = 2\,286$

$$\begin{array}{r} 46 \\ 381 \overline{)17902} \\ \underline{1524 \downarrow} \\ 2662 \\ \underline{2286} \end{array}$$

Step 3: Subtract

1. $2\,662 - 2\,286 = 376$
2. Check $376 < 381$? YES!

$$\begin{array}{r}
 46 \\
 381 \overline{)17902} \\
 \underline{1524 \downarrow} \\
 2662 \\
 \underline{2286} \\
 376
 \end{array}$$

Step 4: No more digits to bring down.

$$17\,902 \div 381 = 46 \text{ R}376$$

Exercise 8

Divide and check your answers. These questions are hard work! Check your work using the answer key at the end of the exercise.

a. $115 \overline{)8682}$

c. $325 \overline{)66321}$

e. $860 \overline{)262412}$

b. $205 \overline{)2384}$

d. $241 \overline{)13284}$

f. $659 \overline{)270190}$

Answers to Exercise 8

a. 75 R57

c. 204 R21

e. 305 R112

b. 11 R129

d. 55 R29

f. 410

Topic D: Self-Test**Mark /12 Aim 10/12**Divide and check your work for questions **b** and **f** using multiplication. (12 marks)

a. $185 \div 10 =$

e. $67 \overline{)5963}$

i. $606 \overline{)26094}$

b. $4 \overline{)92}$

f. $53 \overline{)4856}$

j. $1000 \overline{)83652}$

c. $408 \div 50 =$

g. $91 \overline{)8736}$

d. $72 \overline{)6768}$

h. $265 \overline{)133624}$

Answers to Topic D Self-Test

Divide and check your work for questions **b** and **f** using multiplication.

a. $18 \text{ R}5$

b. 23

c. $8 \text{ R}8$

d. 94

e. 89

f. $91 \text{ R}33$

g. 96

h. $504 \text{ R}64$

i. $43 \text{ R}36$

j. $83 \text{ R}652$

Topic E: Estimating Quotients

Divide Numbers That Both End With Zeros

In Unit 1 you learned a shortcut for multiplying numbers that end with zeros.

Now you will learn a shortcut to divide numbers that **both** end with zeros. First do this exercise and notice the pattern in the quotients.

Exercise 1

Divide. Check your work using the answer key at the end of the exercise.

a. $2\overline{)6}$

d. $2000\overline{)6000}$

g. $500\overline{)2500}$

b. $20\overline{)60}$

e. $5\overline{)25}$

h. $5000\overline{)25000}$

c. $200\overline{)600}$

f. $50\overline{)250}$

i. $14\overline{)28}$

j. $140 \overline{)280}$

k. $1400 \overline{)2800}$

l. $14000 \overline{)28000}$

Answers to Exercise 1

a. 3

e. 5

i. 2

b. 3

f. 5

j. 2

c. 3

g. 5

k. 2

d. 3

h. 5

l. 2

Here is the shortcut:

When dividing numbers that both end with zeros, cross off the **same number of zeros** from the end of the divisor and the dividend. This is sometimes called **canceling zeros**.

Example A

$$4800 \div 60 = 480 \cancel{0} \div 6 \cancel{0}$$

$$\begin{array}{r} 80 \\ 6 \overline{)480} \end{array}$$

Example B

$$23000 \div 500 = 230\cancel{00} \div 5\cancel{00}$$

$$\begin{array}{r} 46 \\ 5 \overline{)230} \\ \underline{20} \downarrow \\ 30 \\ \underline{30} \\ 0 \end{array}$$

Example C

$$2\cancel{000} \overline{)680\cancel{000}}$$

$$\begin{array}{r} 340 \\ 2 \overline{)680} \\ \underline{6} \downarrow \\ 08 \\ \underline{8} \downarrow \\ 00 \\ \underline{0} \\ 0 \end{array}$$

If you are interested in the facts of arithmetic that make this shortcut work, ask your instructor for an explanation.

Exercise 2

Quickly find the quotients. Remember to cancel the **same number** of zeros in both the divisor and dividend in each question. Check your work using the answer key at the end of the exercise.

a. $30 \overline{)90}$

d. $400 \overline{)20000}$

g. $60000 \overline{)2400000}$

b. $40 \overline{)1600}$

e. $500 \overline{)35000}$

h. $800000 \overline{)400000000}$

c. $300 \overline{)1200}$

f. $700 \overline{)42000}$

Answers to Exercise 2

a. 3

d. 50

g. 40

b. 40

e. 70

h. 500

c. 4

f. 60

Rounding Division Questions to Estimate

We round numbers and estimate to get a quick answer.

In division, round the divisor and dividend **before** you divide.

1. If the divisor only has one digit, do not round it,
2. Round the dividend to make the arithmetic easier for yourself.

Example D

Look at the two ways of rounding this question.

$$1796 \div 32 =$$

The divisor (32) will round to 30. This dividend (1796) can be rounded to 1800 or to 2000. Let's try each:

Round to 1800.

$$\begin{array}{r} 60 \\ 3\cancel{0} \overline{)180\cancel{0}} \end{array}$$

Round to 2000.

$$\begin{array}{r} 66 \text{ R}2 \\ 3\cancel{0} \overline{)200\cancel{0}} \\ \underline{18 \downarrow} \\ 20 \\ \underline{18} \\ 2 \end{array}$$

Rounding 1796 to 1800 is easier arithmetic because $18 \div 3$ works out evenly, so $180 \div 3$ works out evenly. Both estimates are correct.

Example E

$$2\,688 \div 28 =$$

1. Round the divisor (28) to 30.
2. Round the dividend (2688) to 2700 or to 3000.

Round to 2700	$\begin{array}{r} 90 \\ 30 \overline{)2700} \end{array}$
Round to 3000	$\begin{array}{r} 100 \\ 30 \overline{)3000} \end{array}$

Both estimates are correct and both are easy to do.

Example F

$$2\,893 \div 47 =$$

1. Round the divisor (47) to 50.
2. Round the dividend (2 893) to 2 900 or 3 000.
3. Which rounded dividend will be easier to divide by 50?

1. Answer: The 3000 because 5 goes evenly into 30.

$$\begin{array}{r} 60 \\ 50 \overline{)3000} \end{array}$$

Exercise 3

Give an estimated quotient. Show your rounding.

a. $365 \overline{)27692}$

e. $56 \overline{)4792}$

i. $19 \overline{)1672}$

b. $23 \overline{)34459}$

f. $75 \overline{)7648}$

j. $200 \overline{)20000}$

c. $45 \overline{)4590}$

g. $81 \overline{)4049}$

k. $557 \overline{)41680}$

d. $16 \overline{)6729}$

h. $68 \overline{)5636}$

Answers to Exercise 3

a. $28\,000 \div 400 = 70$

e. $4\,800 \div 60 = 80$

i. $2\,000 \div 20 = 100$

b. $34\,000 \div 20 = 1700$

f. $8\,000 \div 80 = 100$

j. $20\,000 \div 200 = 100$

c. $5\,000 \div 50 = 100$

g. $4\,000 \div 80 = 50$

k. $42\,000 \div 600 = 70$

d. $7\,000 \div 20 = 350$

h. $5\,600 \div 70 = 80$

Topic E: Self-Test

Mark /6 Aim 5/6

A. Give an estimated quotient. Show your work. (6 marks)

a. $98 \overline{)8541}$

c. $241 \overline{)26348}$

e. $24 \overline{)1776}$

b. $27 \overline{)2963}$

d. $55 \overline{)3276}$

f. $59 \overline{)11830}$

Answers to Topic E Self-Test

A. Give an estimated quotient. Show your work.

a. $8\,500 \div 100 = 85$

c. $26\,000 \div 200 = 130$

e. $2\,000 \div 20 = 100$

b. $3\,000 \div 30 = 100$

d. $3\,000 \div 60 = 50$

f. $12\,000 \div 60 = 200$

Topic F: Division Problems

Review Topic F: Problem Solving in *Adult Literacy Fundamentals Mathematics: Book Two*.

One common type of division problem gives a total amount for **several** things and asks you to **find** what the amount would be for **one**.

Problems may tell you...	and ask you to find...
kilometres driven in 8 hours (h)	km driven in 1 h
cost for 15 kg (or litres, etc.)	cost for one kg
pay for 40 hours	pay for one hour
rent for one year (12 months)	rent for one month
work done in eight hours	work done in one hour
kilometres driven on 55 L of gas	km driven on 1 L of gas

The word *per* is a Latin word meaning “for each”. For example, “Find the kilometres *per* hour” may be used to mean, “Find the kilometres driven in one hour.” A slash (/) also means *per* e.g. km/h.

“Find the average” is another way of asking you to find the amount for one.

It may be difficult to decide which number is the dividend and which is the divisor. These suggestions should help:

- Look at the question in the problem. What do you have to find out? Look for the words “per” and “for one.”
- How will the answer be written? That is your clue. If the answer is km/h then the division equation will be total km \div h. Study these examples:
 - total of kilometres \div number of hours = km/h
 - total of kilometres \div number of litres = km/L

- $\text{total cost} \div \text{unit} = \text{cost per unit}$
 - $\text{total pay} \div \text{hours (or days, etc.)} = \text{pay per hour}$
 - $\text{total rent} \div \text{number of months} = \text{rent/month}$
 - $\text{total things done} \div \text{total time} = \text{number done/unit of time}$
- Do a quick estimate.
 - Look at your estimate and re-read the problem. Does your answer make sense?

To **find the average**, divide the total amount by the number of items that make up the total. You may first have to add the different items together to find the total.

Average = Total amount divided by the number of items that make the total

Example A

You bowled 5 games with scores of 124, 187, 164, 205, 130. What was your average score?

1. Find the total by adding $124 + 187 + 164 + 205 + 130 = 810$
2. Divide the total by number of items $810 \div 5 \text{ games} = 162 \text{ per game}$

Example B

Joan and Rick have been keeping track of their household costs. They want to plan a monthly budget. Their grocery bills for six months were \$428, \$605, \$397, \$530, \$590, and \$474. What is their average monthly grocery cost?

1. Find the total amount.

$$\$428 + \$605 + \$397 + \$530 + \$590 + \$474 = \$3\,024$$

2. Divide total amount by number of items.

$$\$3\,024 \div 6 = \$504 \text{ average cost per month}$$

Some details to remember:

- 1 minute = 60 seconds
- 1 hour = 60 minutes
- 1 year = 365 days
- 1 year = 12 months
- 1 year = 52 weeks

Key words that point to division:

- Find the average
- Separated
- Find the ____ per ____
- Split
- Find the unit price
- Shared

Exercise 1

Solve these problems. Use the five problem solving steps. Be sure to write down an estimate and check that the estimate makes sense **before** you find the actual solution. Check your work using the answer key at the end of the exercise.

a. A machine shop can stamp out 360 car parts in an 8 hour work day. How many parts is that per hour?

b. Izyan paid \$560 for 4 tires. How much did each tire cost?

c. Bjork earned \$8 840 in 4 months.

i. How much did he earn each month?

ii. How much did he earn per week? (4 months is 17 weeks)

d. Theron used 9 L of gasoline to drive 207 km. How many kilometres did he drive per litre?

e. The total cost of the car Elena bought is \$14 880 including taxes and interest. She will pay for it in 24 equal payments. How much will each payment be?

f. Diego worked 8 hours a day for five days and earned \$360. How much was he paid per hour? (This is a two-step problem – you must first find the total number of hours.)

g. Dae-Hyun and Mi-Ok can afford no more than a total of \$14 940 per year for rent, electricity, and phone. How much can they pay per month?

Answers to Exercise 1

- a. 45 parts per hour
- b. \$140 per tire
 - i. \$2,210 per month
 - ii. \$520 per week
- c. 23 km/L
- d. \$620 per payment

e. \$9 per hour

f. \$1,245 per month

A second type of division problem gives the total amount and the size of each group. You will find the number of groups. You will notice that **both numbers have the same units**. The **answer** to the problem **will give another unit**. This other unit will be asked for in the problem.

Example C

One necklace uses **125 beads**. How many necklaces can Susan make for the craft fair if she has **6 250 beads**?

Find how many groups of 125 there are in 6 520.

$$6\,250 \div 125 =$$

$$\begin{array}{r} 50 \\ 125 \overline{)6250} \\ \underline{625} \\ 0 \end{array}$$

She can make **50 necklaces**.

Example D

If you drive an average speed of 80 km an hour, how many hours will it take you to drive 560 km?

Find how many groups of 80 km there are in 560 km.

$$56\cancel{0} \div 8\cancel{0} = 7$$

The 560 km trip will take 7 hours.

- d. If you spend an average of 8 minutes on one math problem, how many problems can you finish in one hour? Will you have any time left? How much?
- e. The Skating Club members decided to sell homemade fudge to raise money. The boxes they bought will hold 45 pieces of fudge. If everyone makes a double batch of fudge they will have 2 590 pieces. How many boxes can they fill? How many pieces of fudge are left-over for them to eat?
- f. A class of 334 students is going to Victoria by bus. Each bus holds 43 passengers. How many buses do they need? Will there be any empty seats? (Be careful with this one!)

Answers to Exercise 2

- a. 6 hours
 b. 8 L
 c. 29 parking spaces
 d. 7 problems, yes, 4 min
 e. 57 boxes, 25 pieces left over
 f. 8 buses, 10 empty seats

Unit Pricing

A unit price is the price for one of something. To find unit price, divide the total cost by the number of things bought.

Example E

5 shirts cost \$60

To find the cost per shirt, $\$60 \div 5 =$

$$\begin{array}{r} 12 \\ 5 \overline{)60} \end{array}$$

The unit price is \$12.

Example F

6 L of oil for \$18

To find the cost per L, $\$18 \div 6 =$

$$\begin{array}{r} 3 \\ 6 \overline{)18} \end{array}$$

The unit price is \$3.

Exercise 3

Solve the cost per unit price. Check your work using the answer key at the end of the exercise.

a. 2 CDs for \$26

f. 2 cans of peanuts for \$8

b. 3 cans of dog food for \$6

g. 2 ice cream for \$12

c. 4 air fresheners for \$8

h. 4 boxes of chocolate bars for \$48

d. 2 cat treats for \$4

i. 2 WD-40 for \$6

e. 2 pizzas for \$22

j. 3 paint rollers for \$9

k. 4 tie downs for \$20

m. 3 work shirts for \$45

l. 3 boxes of diapers for \$51

n. 8 pairs of socks for \$64

Answers to Exercise 3

a. \$13

h. \$12

b. \$2

i. \$3

c. \$2

j. \$3

d. \$2

k. \$5

e. \$11

l. \$17

f. \$4

m. \$15

g. \$6

n. \$8

Best Buy

The **best buy** is the **lowest unit price**.

Example G

You can buy 4 L of canola oil for \$8 or 10 L of canola oil for \$30. Which is the best buy?

$\$8 \div 4 =$ can be rewritten and solved:
$$\begin{array}{r} 2 \\ 4 \overline{)8} \end{array}$$

$\$30 \div 10 =$ can be rewritten and solved:
$$\begin{array}{r} 3 \\ 10 \overline{)30} \end{array}$$

4 L of canola oil for \$8 is a better buy since the unit price is \$2 per L, while 10 L for \$30 has a unit price of \$3 per L.

Exercise 4

Solve the unit price and then underline the best buy.

a. 2 L of engine oil for \$8 or 5 L of engine oil for \$15

b. 4 tires for \$240 or 2 tires for \$110

c. 6 jars of salad dressing for \$24 or 3 jars of salad dressing for \$15

d. 7 kg of dog food for \$21 or 16 kg of dog food for \$32

e. 3 DVDs for \$54 or 7 DVDs for \$119

f. 3 L of laundry soap for \$6 or 17 L of laundry soap for \$68

Answers to Exercise 4

- a. \$4, \$3, 5 L for \$15 is the best buy. d. \$3, \$2, 16 kg for \$32 is the best buy.
- b. \$60, \$55, 2 tires for \$110 is the best buy. e. \$18, \$17, 7 DVDs for \$119 is the best buy.
- c. \$4, \$5, 6 salad dressing for \$24 is the best buy. f. \$2, \$4, 3 L for \$6 is the best buy.

- c. The proud gardener grew a total crop of 135 cucumbers on 15 plants. What was the average crop per plant?
- d. In a recent truckload sale, electric stoves were sold for \$432. The gross income from the stove sale was \$42 336. How many stoves were sold?
- e. The 39 farmers in Jones Valley had a total income last year of \$2 905 500. What was their average income?

- f. A store has an inventory (stock on hand) of chairs with a total value of \$1 738. Each chair is to be sold at \$79. How many of these chairs are there?

Answers to Topic F Self-Test

- | | |
|--------------------------|--------------|
| a. 80 km/h | d. 98 stoves |
| b. \$3 237 per month | e. \$74 500 |
| c. 9 cucumbers per plant | f. 22 chairs |

Topic G: Mixed Problems

Carefully read again the **Problem Solving Steps** in Adult Literacy Fundamentals Mathematics: Book Two, Topic F or ask your instructor for a copy of those pages. Read the problems to get a feel for the wording and types of problem situations you can expect for addition, subtraction, multiplication, and division problems. Ask your instructor for a list of key words that will point to the operation you should choose.

Exercise 1

Solve these problems using the five problem solving steps. Show your estimation and actual work. Write a sentence answer remembering to use the **units**. Check your work using the answer key at the end of the exercise.

- a. Saika gave her students cinnamon hearts on Valentine's Day. She bought a box of 120 cinnamon hearts and gave each student 35 candies, using up the whole box. How many students does she have?

- b. Each stamp cost 57 cents. Dolores bought 100 stamps. How much money did she spend on stamps (before taxes)?
- c. Etienne planted 30 tomato plants in rows of 5 plants. How many rows did he plant?
- d. There are 8 servings per large economy-size can of fruit. The restaurant ordered 5 cases with 24 cans per case. How many servings of fruit can the restaurant get from this order? (This is a two step problem – first find the total number of cans. Then use that number to find the number of servings.)

- e. A train traveled 2 250 km at a speed of 75 km per hour. How many hours did the trip take?
- f. The regular mountain bike costs \$499 and the fancy model is \$675. How much more do you pay for the fancy mountain bike?
- g. The members of the Shiny Wheels Bicycle Club ride at an average speed of 16 km/h. On their weekend trip, they rode 2 hours Friday night, 7 hours on Saturday, took a two hour break to soak their aching bones at the Hot Springs, and then rode a final 5 hours on Sunday. How many kilometres did they ride on this weekend trip? (2 steps)

- h. Last week Mrs. Sanderson drove 29 km on Monday, 42 km on Tuesday, 5 km on Wednesday, and 21 km on Friday. How far did she drive last week?

Answers to Exercise 1

- | | |
|-----------------|---------------|
| a. 32 students | e. 30 hours |
| b. \$57.00 | f. \$176 more |
| c. 6 rows | g. 224 km |
| d. 960 servings | h. 97 km |

Unit 2 Review: Division

You will now practice all the skills you learned in Unit 2. Check your work using the answer key at the end of the review.

A. Complete this chart

	Multiplication	Division	Division	“Say”
a)	$5 \times 3 = 15$ $3 \times 5 = 15$	$15 \div 3 = 5$ $15 \div 5 = 3$	$\begin{array}{r} 5 \\ 3 \overline{)15} \\ \underline{3} \\ 5 \overline{)15} \\ \underline{15} \\ 0 \end{array}$	“15 divided by 3 is 5.” “15 divided by 5 is 3.”
b)	$3 \times 6 = 18$			
c)	$3 \times 7 = 21$			
d)	$5 \times 9 = 45$			

B. Give the answer.

a. $56 \div 7 =$

c. $54 \div 9 =$

e. $9 \overline{)72}$

b. $40 \div 8 =$

d. $6 \overline{)42}$

f. $8 \overline{)32}$

C. Find the quotients.

a. $7 \overline{)68}$

c. $5 \overline{)24}$

b. $4 \overline{)29}$

d. $6 \overline{)53}$

D. For each number, identify if it is divisible by 2, 3, 5, and 9.

#	Number	2	3	5	9
a)	135				
b)	384				
c)	4 614				
d)	495				
e)	648				
f)	745				

E. Find the quotients.

a. $8 \overline{)296}$

c. $4 \overline{)732}$

b. $6 \overline{)252}$

d. $5 \overline{)175}$

F. Find the quotients.

a. $3 \overline{)86}$

b. $4 \overline{)97}$

c. $2\overline{)71}$

d. $5\overline{)59}$

G. Find the quotients.

a. $7\overline{)615}$

c. $3\overline{)781}$

b. $2\overline{)647}$

d. $9\overline{)839}$

H. Find the quotients.

a. $8956 \div 42 =$

c. $69140 \div 56 =$

b. $32\overline{)832}$

d. $312\overline{)9984}$

e. $41082 \div 334 =$

g. $275 \overline{)55661}$

f. $781 \overline{)39752}$

h. $307 \overline{)91838}$

I. Find the quotients.

a. $1000 \overline{)38645}$

c. $4923 \div 10 =$

b. $18592 \div 100 =$

d. $100 \overline{)17342}$

J. Quickly find the quotients. Remember to cancel the same number of zeros in both the divisor and dividend in each question.

a. $200 \overline{)50000}$

c. $40000 \overline{)1600000}$

b. $6000 \overline{)360000}$

d. $70000 \overline{)6300000}$

K. Give an estimated quotient. Show your rounding.

a. $37 \overline{)15725}$

c. $768 \overline{)63721}$

b. $54 \overline{)8478}$

d. $6267 \overline{)536497}$

L. Word Problems

- a. At the Kaizen Factory, 14 325 cars were put together in 5 days. Each day the same number of cars were built. How many cars were built each day?

- b. The Blaster Rubber Company needs to make 6 912 hockey pucks. Mr. Frost, the foreman, says that their machines can make the pucks in 12 hours. How many pucks would be made in one hour?
- c. The distance between Fort St. John and Kimberley is 1 092 km. What was your average speed if the trip took 12 hours?
- d. The new stadium has 15 981 seats divided evenly into 76 sections. Estimate how many seats are in each section?

M. Solve the cost per unit price.

- a. 4 rolls of hockey tape for \$8 b. 4 cans of butane fuel for \$12

N. Solve the unit price and then underline the best buy.

- a. 2 L of antifreeze for \$6 or 5 L of antifreeze for \$10
- b. 8 kilograms of bird seed for \$16 or 4 kilograms of bird seed for \$12

O. Word Problems.

- a. The bakery uses 43 kilograms of butter in each batch of shortbread cookies. How many batches of shortbread can be made from 3 569 kilograms of butter?

- b. Each crate that the men unloaded weighed 175 kilograms. If they unloaded 232 crates, how many kilograms did they unload?
- c. The parts factory produced 4 173 less parts this month than last month. The factory produced 49 736 parts this month. How many parts did the factory produce last month?
- d. Three Eastjet jets were flown 24 826 kilometres, 9 423 kilometres and 56 015 kilometres. What is the total kilometres the three jets were flown?

Answers to Unit 2 Review

A. Complete this chart

#	Multiplication	Division	Division	“Say”
a)	$5 \times 3 = 15$ $3 \times 5 = 15$	$15 \div 3 = 5$ $15 \div 5 = 3$	$\begin{array}{r} 5 \\ 3 \overline{)15} \\ \underline{3} \\ 5 \overline{)15} \end{array}$	15 divided by 3 is 5. 15 divided by 5 is 3.
b)	$3 \times 6 = 18$ $6 \times 3 = 18$	$18 \div 6 = 3$ $18 \div 3 = 6$	$\begin{array}{r} 3 \\ 6 \overline{)18} \\ \underline{6} \\ 3 \overline{)18} \end{array}$	18 divided by 3 is 6. 18 divided by 6 is 3.
c)	$3 \times 7 = 21$ $3 \times 7 = 21$	$21 \div 7 = 3$ $21 \div 3 = 7$	$\begin{array}{r} 3 \\ 7 \overline{)21} \\ \underline{7} \\ 3 \overline{)21} \end{array}$	21 divided by 7 is 3. 21 divided by 3 is 7.
d)	$5 \times 9 = 45$ $9 \times 5 = 45$	$45 \div 9 = 5$ $45 \div 5 = 9$	$\begin{array}{r} 5 \\ 9 \overline{)45} \\ \underline{9} \\ 5 \overline{)45} \end{array}$	45 divided by 9 is 5. 45 divided by 5 is 9.

B. Give the answer.

a. 8

c. 6

e. 8

b. 5

d. 7

f. 4

C. Find the quotients.

a. 9 R5

c. 4 R4

b. 7 R1

d. 8 R5

D. For each number, identify if it is divisible by 2, 3, 5, and, 9.

	Number	2	3	5	9
a)	135	No	Yes	Yes	Yes
b)	384	Yes	Yes	No	No
c)	4 614	Yes	Yes	No	No
d)	495	No	Yes	Yes	Yes
e)	648	Yes	Yes	No	Yes
f)	745	No	No	Yes	No

E. Find the quotients.

- | | |
|-------|--------|
| a. 37 | c. 183 |
| b. 42 | d. 35 |

F. Find the quotients.

- | | |
|----------|----------|
| a. 28 R2 | c. 35 R1 |
| b. 24 R1 | d. 11 R4 |

G. Find the quotients.

- | | |
|-----------|-----------|
| a. 87 R6 | c. 260 R1 |
| b. 323 R1 | d. 93 R2 |

H. Find the quotients.

- | | |
|--------------|-------------|
| a. 213 R10 | e. 123 |
| b. 26 | f. 50 R702 |
| c. 1 234 R36 | g. 202 R111 |
| d. 32 | h. 299 R45 |

I. Find the quotients.

- | | |
|------------|------------|
| a. 38 R645 | c. 492 R3 |
| b. 185 R92 | d. 173 R42 |

J. Quickly find the quotients. Remember to cancel the same number of zeros in both the divisor and dividend in each question.

a. 250

c. 40

b. 60

d. 90

K. Give an estimated quotient. Show your rounding.

a. $1600 \div 40 = 400$

c. $64000 \div 800 = 80$

b. $8500 \div 50 = 170$

d. $540000 \div 6000 = 90$

L. Word Problems

a. 2 865 cars per day

d. $16000 \div 80 = 200$ 200 seats per section

b. 576 pucks per hour

c. 91 km per hour

M. Solve the cost per unit price.

a. \$2

b. \$3

N. Solve the unit price and then underline the best buy.

a. \$3, \$2, 5 L of antifreeze for \$10 is the best buy

b. \$2, \$3, 8 kilograms of bird seed for \$16 is the best buy

O. Word Problems.

a. 83 batches

c. 53 909 parts

b. 40 600 kilograms

d. 90 264 kilometres

CONGRATULATIONS!!

Now you have finished Unit 2.

TEST TIME!

Ask your instructor for the practice test for this unit.

Once you've done the practice test, you need to do the unit 2 test. Again, ask your instructor for this.

Good luck!

Unit 3: Change and The Metric System

Topic A: Counting to Make Change

Practice your counting by filling in the counting chart. Have your instructor check your chart when you are done.

0	1	2	3	4	5	6	7	8	9
10									

Use your counting chart and start at 0. Count by twos and write down that number.

0	2	4							

If you had a pile of toonies or two dollar coins and wanted to know how much money you have, you would count by 2's.

Use your counting chart and start at 0. Count by fives and write down that number.

0	5	10	

If you had a pile of nickels or five dollar bills and wanted to know how much money you have, you would count by 5's.

Use your counting chart and start at 0. Count by tens and write down that number.

0	10	20	

If you had a pile of dimes or ten dollar bills and wanted to know how much money you have, you would count by 10's.

Use your counting chart and start at 0. Count by twenty and write down that number.

0	20	40			
---	----	----	--	--	--

If you had a pile of twenty dollar bills and wanted to know how much money you have, you would count by 20's.

Use your counting chart and start at 0. Count by twenty-fives and write down that number.

0	25			
---	----	--	--	--

If you had a pile of quarters and wanted to know how much money you have, you would count by 25's.

g. Count by 20's

0		40		80	
---	--	----	--	----	--

h. Count by 20's

0					
---	--	--	--	--	--

i. Count by 25's.

0	25		75	
---	----	--	----	--

j. Count by 25's.

0		50		100
---	--	----	--	-----

k. Count by 25's.

0				
---	--	--	--	--

Answers to Exercise 1

a. Count by 5's.

0	5	10	15	20	25	30	35	40	45
50	55	60	65	70	75	80	85	90	95

b. Count by 5's.

0	5	10	15	20	25	30	35	40	45
50	55	60	65	70	75	80	85	90	95

c. Count by 5's.

0	5	10	15	20	25	30	35	40	45
50	55	60	65	70	75	80	85	90	95

d. Count by 10's.

0	10	20	30	40	50	60	70	80	90	100
---	----	----	----	----	----	----	----	----	----	-----

e. Count by 10's.

0	10	20	30	40	50	60	70	80	90	100
---	----	----	----	----	----	----	----	----	----	-----

f. Count by 10's.

0	10	20	30	40	50	60	70	80	90	100
---	----	----	----	----	----	----	----	----	----	-----

g. Count by 20's

0	20	40	60	80	100
---	----	----	----	----	-----

h. Count by 20's

0	20	40	60	80	100
---	----	----	----	----	-----

i. Count by 25's.

0	25	50	75	100
---	----	----	----	-----

j. Count by 25's.

0	25	50	75	100
---	----	----	----	-----

k. Count by 25's.

0	25	50	75	100
---	----	----	----	-----

Topic B: Making Change

When you make change, your first goal is to get a number that ends in 0 or 5. For example, if you bought something for \$4, the first thing to do would be to get to \$5. Check out Example A below.

Example A

\$4 to \$5

To get from \$4 to \$5, you would need 1 loonie.

Example B

\$23 to \$25

To get from \$23 to \$25, you would need 1 toonie.

Example C

\$55 to \$60

To get from \$55 to \$60, you would need 1 five dollar bill.

Exercise 1

Circle the number of coins or bills you would need to get from the first number to the second number. Make sure to use the least number of coins or bills. Check your work using the answer key at the end of the exercise.

a. \$33 to \$35



b. \$48 to \$50



c. \$16 to \$20



d. \$68 to \$70



e. \$10 to \$15



f. \$35 to \$40



g. \$55 to \$60



h. \$85 to \$90



i. \$60 to \$70



j. \$90 to \$100



k. \$30 to \$40



l. \$40 to \$50



m. \$30 to \$50



n. \$70 to \$80



o. \$80 to \$100



p. \$45 to \$50



q. \$21 to \$25



r. \$55 to \$60



s. \$45 to \$50



t. \$40 to \$50



u. \$70 to \$80



Answers to Exercise 1

- | | | |
|---------------|----------------|----------------|
| a. 1 toonie | h. 1 \$5 bill | o. 1 \$20 bill |
| b. 1 toonie | i. 1 \$10 bill | p. 1 \$5 bill |
| c. 2 toonies | j. 1 \$10 bill | q. 2 toonies |
| d. 1 toonie | k. 1 \$10 bill | r. 1 \$5 bill |
| e. 1 \$5 bill | l. 1 \$10 bill | s. 1 \$5 bill |
| f. 1 \$5 bill | m. 1 \$20 bill | t. 1 \$10 bill |
| g. 1 \$5 bill | n. 1 \$10 bill | u. 1 \$10 bill |

Exercise 2

State the number and kind of coins and bills you would need to get from the first number to the second number. Make sure you use the least number of coins and bills as possible.

Example: \$56 to \$60. You require 2 toonies to get to \$60.

- | | |
|------------------|-----------------|
| a. \$28 to \$30 | d. \$32 to \$50 |
| b. \$35 to \$40 | e. \$54 to \$55 |
| c. \$90 to \$100 | f. \$30 to \$50 |

g. \$65 to \$70

h. \$45 to \$50

Answers to Exercise 2

a. 1 toonie

e. 1 loonie

b. 1 \$5 bill

f. 1 \$20 bill

c. 1 \$10 bill

g. 1 \$5 bill

d. 1 \$10 bill, 1 \$5 bill, 1 toonie, and 1 loonie

h. 1 \$5 bill

Example D**\$28 to \$50**

Need	To get to
1 toonie	\$30
1 \$20 bill	\$50

Example E**\$36 to \$50**

Need	To get to
2 toonies	\$40
1 \$10 bill	\$50

Example F

\$63 to \$80

Need	To get to
1 toonie	\$65
1 \$5 bill	\$70
1 \$10 bill	\$80

Exercise 3

State the number and kind of coins and bills you would need to get from the first number to the second number. Make sure you use the least number of coins and bills as possible. Check your work using the answer key at the end of the exercise.

Example:

\$67 to \$80

Need	To get to
1 loonie	\$68
1 toonie	\$70
1 \$10 bill	\$80

a.

\$26 to \$40

Need	To get to

b.

\$47 to \$60

Need	To get to

c. **\$69 to \$80**

Need	To get to

g. **\$78 to \$100**

Need	To get to

d. **\$18 to \$20**

Need	To get to

h. **\$82 to \$100**

Need	To get to

e. **\$34 to \$50**

Need	To get to

i. **\$93 to \$100**

Need	To get to

f. **\$51 to \$60**

Need	To get to

j. **\$3 to \$10**

Need	To get to

Answers to Exercise 3

a. **\$26 to \$40** f.

Need	To get to
2 toonies	\$30
1 \$10 bill	\$40

f. **\$51 to \$60**

Need	To get to
2 toonies	\$55
1 \$5 bill	\$60

b. **\$47 to \$60** g.

Need	To get to
1 loonie	\$48
1 toonie	\$50
1 \$10	\$60

g. **\$78 to \$100**

Need	To get to
1 toonie	\$80
1 \$20 bill	\$100

c. **\$69 to \$80** h.

Need	To get to
1 loonie	\$70
1 \$10 bill	\$80

h. **\$82 to \$100**

Need	To get to
1 loonie	\$83
1 toonie	\$85
1 \$5 bill	\$90
1 \$10 bill	\$100

d. **\$18 to \$20** i.

Need	To get to
1 toonie	\$20

i. **\$93 to \$100**

Need	To get to
1 toonie	\$95
1 \$5 bill	\$100

e. **\$34 to \$50** j.

Need	To get to
2 toonies	\$40
1 \$10 bill	\$50

j. **\$3 to \$10**

Need	To get to
1 toonie	\$5
1 \$5 bill	\$10

Exercise 4

State the number and kind of coins and bills you would need to get change from \$100. Make sure you use the least number of coins and bills as possible.

Example: \$67 to \$100

Need	To get to
1 loonie	\$68
1 toonie	\$70
1 \$10 bill	\$80
1 \$20 bill	\$100

a.

\$26

Need	To get to

c.

\$57

Need	To get to

b.

\$13

Need	To get to

d.

\$49

Need	To get to

e. **\$38** f.

Need	To get to

Need	To get to

Answers to Exercise 4

a. **\$26** d.

Need	To get to
2 toonies	\$30
1 \$10 bill	\$40
3 \$20 bills	\$100

Need	To get to
1 loonie	\$50
1 \$10 bill	\$60
2 \$20 bills	\$100

b. **\$13** e.

Need	To get to
1 toonie	\$15
1 \$5 bill	\$20
4 \$20 bills	\$100

Need	To get to
1 toonie	\$40
3 \$20	\$100

c. **\$57** f.

Need	To get to
1 loonie	\$58
1 toonie	\$60
2 \$20 bills	\$100

Need	To get to
3 toonies	\$80
1 \$20 bill	

Exercise 5

State the number and kind of coins and bills you would need to get from the first number to the second number. Make sure you use the least number of coins and bills as possible.

Example A: \$2.69 from \$5.00

Need	To get to
1 penny	\$2.70
1 nickel	\$2.75
1 quarter	\$3.00
1 toonie	\$5.00

Example B: \$6.29 from \$10.00

Need	To get to
1 penny	\$6.30
2 dimes	\$6.50
2 quarters	\$7.00
1 loonie	\$8.00
1 toonie	\$10.00

u. **\$5.23 from \$20.00**

Need	To get to

v. **\$19.56 from \$40.00**

Need	To get to

Answers to Exercise 5a. **\$2.19 from \$10.00**

Need	To get to
1 penny	\$2.20
1 nickel	\$2.25
3 quarters	\$3
1 toonie	\$5
1 \$5 bill	\$10

c. **\$8.67 from \$20.00**

Need	To get to
3 pennies	\$8.70
1 nickel	\$8.75
1 quarter	\$9
1 loonie	\$10
1 \$10 bill	\$20

b. **\$6.48 from \$20.00**

Need	To get to
2 pennies	\$6.50
2 quarters	\$7
1 loonie	\$8
1 toonie	\$10
1 \$10 bill	\$20

d. **\$3.35 from \$10.00**

Need	To get to
1 nickel	\$3.40
1 dime	\$3.50
2 quarters	\$4
1 loonie	\$5
1 \$5 bill	\$10

e. **\$17.81 from \$20.00**

Need	To get to
4 pennies	\$17.85
1 nickel	\$17.90
1 dime	\$18
1 toonie	\$20

i. **\$19.87 from \$50.00**

Need	To get to
3 pennies	\$19.90
1 dime	\$20
1 \$10 bill	\$30
1 \$20 bill	\$50

f. **\$50.22 from \$60.00**

Need	To get to
3 pennies	\$50.25
3 quarters	\$51
2 toonies	\$55
1 \$5 bill	\$60

j. **\$4.36 from \$5.00**

Need	To get to
4 pennies	\$4.40
1 dime	\$4.50
2 quarters	\$5

g. **\$20.51 from \$40.00**

Need	To get to
4 pennies	\$20.55
2 dimes	\$20.75
1 quarter	\$21
2 toonies	\$25
1 \$5 bill	\$30
1 \$10 bill	\$40

k. **\$44.54 from \$60.00**

Need	To get to
1 penny	\$44.55
2 dimes	\$44.75
1 quarter	\$45
1 \$5 bill	\$50
1 \$10 bill	\$60

h. **\$37.72 from \$50.00**

Need	To get to
3 pennies	\$37.75
1 quarter	\$38
1 toonie	\$40
1 \$10 bill	\$50

l. **\$29.14 from \$40.00**

Need	To get to
1 penny	\$29.15
1 dime	\$29.25
3 quarters	\$30
1 \$10 bill	\$40

m. **\$65.76 from \$80.00**

Need	To get to
4 pennies	\$65.80
2 dimes	\$66
2 toonies	\$70
1 \$10 bill	\$80

q. **\$58.27 from \$100**

Need	To get to
1 dime	\$61.25
3 quarters	\$62
1 loonie	\$63
1 toonie	\$65
1 \$5 bill	\$70
1 \$10 bill	\$80

n. **\$41.98 from \$60.00**

Need	To get to
2 pennies	\$42
1 loonie	\$43
1 toonie	\$45
1 \$5 bill	\$50
1 \$10 bill	\$60

r. **\$61.15 from \$80.00**

Need	To get to
1 dime	\$61.25
3 quarters	\$62
1 loonie	\$63
1 toonie	\$65
1 \$5 bill	\$70
1 \$10 bill	\$80

o. **\$97.69 from \$100**

Need	To get to
1 penny	\$97.70
1 nickel	\$97.75
1 quarter	\$98
1 toonie	\$100

s. **\$72.84 from \$100**

Need	To get to
1 penny	\$72.85
1 nickel	\$72.90
1 dime	\$73
1 toonie	\$75
1 \$5 bill	\$80
1 \$20 bill	\$100

p. **\$32.02 from \$35.00**

Need	To get to
3 pennies	\$32.05
2 dimes	\$32.25
3 quarters	\$33
1 toonie	\$35

t. **\$83.91 from \$100**

Need	To get to
4 pennies	\$83.95
1 nickel	\$84
1 loonie	\$85
1 \$5 bill	\$90
1 \$10 bill	\$100

v. **\$19.56 from \$40.00**

Need	To get to
4 pennies	\$19.60
1 nickel	\$19.65
1 dime	\$19.75
1 quarter	\$20
1 \$20 bill	\$40

u. **\$5.23 from \$20.00**

Need	To get to
2 pennies	\$5.25
3 quarters	\$6
2 toonies	\$10
1 \$10 bill	\$20

Exercise 6

State the number and kind of coins and bills you would need to get from the first number to the second number. Make sure you use the least number of coins and bills as possible.

a. \$1.74 from \$10.00

d. \$28.16 from \$40.00

b. \$54.05 from \$60.00

e. \$73.97 from \$80.00

c. \$96.43 from \$100.00

f. \$32.81 from \$50.00

g. \$9.38 from \$20.00

h. \$85.25 from \$100.00

Answers to Exercise 6

a. \$1.74 from \$10.00

- 1 penny
- 1 quarter
- 1 loonie
- 1 toonie

b. \$54.05 from \$60.00

- 2 dimes
- 3 quarters
- 1 \$5 bill

c. \$96.43 from \$100.00

- 2 pennies
- 1 nickel
- 2 quarters

d. \$28.16 from \$40.00

- 4 pennies
- 1 nickel
- 3 quarters
- 1 loonie

e. \$73.97 from \$80.00

◦ 3 pennies

◦ 1 loonie

◦ 1 \$5 bill

f. \$32.81 from \$50.00

◦ 4 pennies

◦ 1 nickel

◦ 1 dime

◦ 1 toonie

◦ 1 \$5 bill

◦ 1 \$10 bill

g. \$9.38 from \$20.00

◦ 2 pennies

◦ 1 dime

◦ 2 quarters

◦ 1 \$10 bill

h. \$85.25 from \$100.00

◦ 3 quarters

◦ 2 toonies

◦ 1 \$10 bill

Exercise 7

State the number and kind of coins and bills you would need to get change from \$100. Make sure you use the least number of coins and bills as possible. Check your work using the answer key at the end of the exercise.



a. 1 kg of chicken for \$24.59



d. Heavy duty drill costs \$89.89



b. DVD Player for \$25.73



e. Skates cost \$67.49



c. Metal shelf for \$75.59



f. Floor lamp costs \$73.91



- g. coffee maker costs \$22.39



- i. a box of laundry detergent costs \$13.43



- h. a package of toilet paper costs \$6.71



- j. a can of baby formula costs \$30.23

Answers to Exercise 7

- 1 penny, 1 nickel, 1 dime, 1 quarter, 1 \$5 bill, 1 \$10 bill, 3 \$20 bill
- 2 pennies, 1 quarter, 2 toonies, 1 \$10 bill, 3 \$20 bill
- 1 penny, 1 nickel, 1 dime, 1 quarter, 2 toonie, 1 \$20 bill
- 1 penny, 1 dime, 1 \$10 bill
- 1 penny, 2 quarters, 1 toonie, 1 \$10 bill, 1 \$20 bill
- 4 pennies, 1 nickel, 1 loonie, 1 \$5 bill, 1 \$20 bill
- 1 penny, 1 dime, 2 quarters, 1 toonie, 1 \$5 bill, 1 \$10 bill, 3 \$20 bill

- h. 4 pennies, 1 quarter, 1 loonie, 1 toonie, 1 \$10 bill, 4 \$20 bill
- i. 2 pennies, 1 nickel, 2 quarters, 1 loonie, 1 \$5 bill, 4 \$20 bill
- j. 2 pennies, 3 quarters, 2 toonies, 1 \$5 bill, 3 \$20 bill

Answers to Exercise 8

- a. 1 penny, 2 toonies, 2 \$20 bills
- b. 2 pennies, 3 quarters, 2 toonies, 1 \$5 bill, 3 \$20 bills
- c. 3 pennies, 1 nickel, 1 quarter, 1 loonie, 1 \$5 bill, 1 \$10 bill, 2 \$20 bills
- d. 4 pennies, 1 nickel, 1 dime, 3 quarters, 2 toonies, 1 \$5 bill, 4 \$20 bills

Topic B: Self-Test

Mark /21 Aim 17/21

A. Circle the number of coins and bills needed to get from the first number to the second number. Use the least number of coins. (4 marks)

a. \$76 to \$80



b. \$22 to \$25



c. \$40 to \$50



d. \$55 to \$60



B. State the number and kind of coins or bills are needed to get from the first number to the second number. (4 marks)

a. \$48 to \$50

c. \$95 to \$100

b. \$76 to \$80

d. \$40 to \$50

C. State the number and kind of coins and bills you would need to get from the first number to the second number. Make sure you use the least number of coins and bills as possible. (4 marks)

a. \$37 to \$50

c. \$42 to \$60

b. \$16 to \$50

d. \$81 to \$100

D. State the number and kind of coins and bills you would need to get change from \$100. Make sure you use the least number of coins and bills as possible. (9 marks)

- a. \$23
- b. \$41
- c. \$68
- d. \$72
- e. groceries cost \$89.63
- f. telephone bill was \$51.08
- g. gas for the car cost \$61.59
- h. Czelinski bought a new vacuum cleaner for \$86.32. What change will get from \$100?
- i. Uchida bought a new frying pan for \$39.19. How much change will she get back from \$100?

Answers to Topic B Self-Test

A.

- a. 2 toonies
- b. 1 loonie, 1 toonie
- c. 1 \$10 bill
- d. 1 \$5 bill

B

- a. 1 toonie
- b. 2 toonies
- c. 1 \$5 bill
- d. 1 \$10 bill

C

- a. 1 toonie, 1 toonie, 1 \$10 bill
- b. 2 toonies, 1 \$10 bill, 1 \$20 bill
- c. 1 loonie, 1 toonie, 1 \$5 bill, 1 \$10 bill
- d. 2 toonies, 1 \$5 bill, 1 \$10 bill

D.

- a. 1 toonie, 1 \$5 bill, 1 \$10 bill, 3 \$20 bills
- b. 2 toonies, 1 \$5 bill, 1 \$10 bill, 2 \$20 bills
- c. 1 toonie, 1 \$10 bill, 1 \$20 bills
- d. 1 loonie, 1 toonie, 1 \$5 bill, 1 \$20 bill
- e. 2 pennies, 1 dime, 1 quarter, 1 \$10 bill
- f. 2 pennies, 1 nickel, 1 dime, 3 quarters, 1 loonie,
- g. 1 penny, 1 nickel, 1 dime, 1 quarter, 1 loonie, 1 toonie, 1 \$5 bill, 1 \$10 bill, 1 \$20 bill
- h. 3 pennies, 1 nickel, 1 dime, 2 quarters, 1 loonie, 1 toonie, 1 \$10 bill
- i. 1 penny, 1 nickel, 3 quarters, 3 \$20 bills

Topic C: The Metric System

When you measure something, you are **comparing**. Measurement is comparing something with a **standard unit of measure**.

In the past, units of measure were based on things found in a community. Often, lengths of parts of the body were used to measure:

- Inch: the width of a thumb
- Span: the distance from tip of thumb to tip of little finger when the hand is spread out
- Foot: the distance from big toe to heel of foot
- Yard (becomes “rod”): the distance from tip of nose to tip of thumb of an outstretched hand and arm
- Cubit: the distance from the tip of the middle finger to the elbow
- Fathom: the distance from the tip of one hand to the tip of the other with both arms stretched out
- Mile: 1000 military double steps in the Roman army (*mile passuum* means “1000 paces”)

The problem with these units was the distances would be different based on the size of the person doing the measuring. The problem grew even more when trade was started between cities.

Over a long period of time, people in different countries came up with different standard units of measure.

The British came up with **imperial units** such as inch, foot, yard and mile.

The French came up with **metric units** such as metre, centimetre, litre and gram. In Canada, we use both metric and imperial units.

Measuring Length

The basic unit of measure for length is the **metre** (abbreviation **m**). If you stretch your arm straight out beside you, a **metre** is about the distance from the tip of your nose to the tip of your middle finger.

Exercise 1

Consider the following distances. Answer yes or no if you would use a metre to measure. Check your work using the answer key at the end of the exercise.

Example:

- The length of a table – Yes
 - The width of your watchband – No
- a. length of your classroom
 - b. thickness of a piece of paper
 - c. length of your pen or pencil
 - d. height of the door
 - e. distance from Prince George to Fort Nelson
 - f. the width of your baby finger

- g. the size of a postage stamp
- h. the thickness of a quarter
- i. the length of the hallway outside your classroom
- j. the distance from your home to college
- k. the height of your coffee mug
- l. the width of your book
- m. the distance from your home to Moncton, New Brunswick
- n. the length of a city bus

Answers to Exercise 1

- | | |
|--------|--------|
| a. yes | h. no |
| b. no | i. yes |
| c. no | j. no |
| d. yes | k. no |
| e. no | l. no |
| f. no | m. no |
| g. no | n. yes |

Exercise 2

Estimate the length of each item. Remember a metre is about the distance from the tip of your nose to the tip of your middle finger when your arm is stretched out beside you. Be sure to include the unit of measure in your answer. Have your instructor check your work.

- a. the height of the doorway
- b. the height of your table
- c. the width of the doorway
- d. the length of your arm
- e. the distance from the floor to hip
- f. the distance from the floor to waist
- g. the height of the ceiling
- h. the width of the window
- i. the length of your classroom
- j. the width of your classroom

Exercise 3

Circle the most reasonable measure. Remember a metre is about the distance from the tip of your nose to the tip of your middle finger when your arm is stretched out beside you. Check your work using the answer key at the end of the exercise.

- | | |
|--------------------------|---------------------------------|
| a. A person's height | d. The length of a bed |
| i. 2m | i. 200 m |
| ii. 20m | ii. 2 m |
| iii. 200m | iii. 20 m |
| b. The height of a child | e. The height of a building |
| i. 10 m | i. 1 m |
| ii. 100 m | ii. 100 m |
| iii. 1 m | iii. 10 m |
| c. The length of a house | f. The height of a refrigerator |
| i. 150 m | i. 20 m |
| ii. 15 m | ii. 200 m |
| iii. 1 m | iii. 2 m |

Answers to Exercise 3

- | | |
|--------|--------|
| a. i | d. ii |
| b. iii | e. ii |
| c. ii | f. iii |

Measuring Small Lengths and Long Distances

It is hard to measure small things using a metre. To measure small things, you can use **centimetre (cm)** or **millimetre (mm)**.

A **centimetre (cm)** is about the width of your baby finger. Remember it is just a guide. A **millimetre (mm)** is about the thickness of your fingernail.

It is hard to measure long distances using a metre. To measure long distances, you can use **kilometre (km)**. A kilometre is 1000 metres.

Exercise 4

For each item, circle the unit of measure you would use. Check your work using the answer key at the end of the exercise

	Item	Unit of Measure
a)	the width of a room	m, cm, mm
b)	the thickness of a coin	m, cm, mm
c)	the length of your pencil	m, cm, mm
d)	the length of the hall	m, cm, mm
e)	the length of this page	m, cm, mm
f)	the length of a screw	m, cm, mm
g)	the height of your cup	m, cm, mm
h)	the length of a bus	m, cm, mm
i)	the thickness of a window pane	m, cm, mm
j)	the width of a chair	m, cm, mm

Answers to Exercise 4

- | | |
|-------|-------|
| a. m | f. mm |
| b. mm | g. cm |
| c. cm | h. m |
| d. m | i. mm |
| e. cm | j. cm |

Exercise 5

For each item, circle the letter of the most reasonable unit of measure. Check your work using the answer key at the end of the exercise.

- | | |
|----------------------------------|--------------------------------------|
| a. The width of a doorway | f. The height of the kitchen counter |
| i. 50 mm | i. 9 m |
| ii. 1 m | ii. 9 cm |
| iii. 50 m | iii. 90 cm |
| b. The length of your pencil | g. The distance around your wrist |
| i. 20 m | i. 15 mm |
| ii. 20 cm | ii. 15 cm |
| iii. 20 mm | iii. 15 m |
| c. The height of a tall building | h. The width of a small TV screen |
| i. 1 m | i. 28 mm |
| ii. 100 m | ii. 128 cm |
| iii. 10 m | iii. 28 m |
| d. The height of a refrigerator | i. The length of a car |
| i. 20 m | i. 5 m |
| ii. 200 m | ii. 5 m |
| iii. 2 m | iii. 5 mm |
| e. The diameter of a quarter | j. The height of a bookcase |
| i. 24 mm | i. 2 cm |
| ii. 24 cm | ii. 2 mm |
| iii. 24 m | iii. 2 m |

Answers to Exercise 5

- | | |
|--------|--------|
| a. ii | f. iii |
| b. ii | g. ii |
| c. ii | h. ii |
| d. iii | i. i |
| e. i | j. iii |

Exercise 6

Fill in the blank with the most reasonable unit of measure. Check your work using the answer key at the end of the exercise

- Most hand held calculators are about 15 ____ long.
- The CN Tower in Toronto is 555 ____ tall.
- Many young men have an 80 ____ waist.
- Computer monitor screens are 28 ____ wide.
- The handle of a hammer is 20 ____ long.
- A table is about 65 ____ long.
- The seat of a chair is about 30 ____ above the floor.
- The window is about 3 ____ long.
- A roll of tape is about 13 ____ wide.
- A rope is about 7 ____ thick.

Answers to Exercise 6

- | | |
|-------|-------|
| a. cm | f. cm |
| b. m | g. cm |
| c. cm | h. m |
| d. cm | i. mm |
| e. cm | j. mm |

Measuring Capacity (Volume)

Volume is a measure of how much space something takes up. The basic unit of measure for volume is the **Litre (L)**.

Can you think of two things that we buy in litres? We buy gasoline and milk in litres.

We use **millilitres (mL)** to measure small volumes. For example, a small cup of coffee is about 180 mL. Can you think of two things we buy in mL?

Exercise 7

Write the unit of measure you would use to measure each item (L or mL). Check your work using the answer key at the end of the exercise.

- | | |
|--------------------------|------------------|
| a. Bottle of pop | h. Mixing bowls |
| b. Gasoline | i. Ketchup |
| c. Car window wash | j. Shampoo |
| d. Can of beans | k. Vinegar |
| e. Large bottle of juice | l. Bathtub |
| f. Liquid dish soap | m. Ice cube tray |
| g. Cough syrup | n. Paint |

Answers to Exercise 7

- | | |
|------------|------------|
| a. mL | h. L |
| b. L | i. mL or L |
| c. L | j. mL |
| d. mL | k. L |
| e. L | l. L |
| f. mL or L | m. mL |
| g. mL | n. L |

Exercise 8

Circle the letter of the most reasonable unit of measure. Check your work using the answer key at the end of the exercise.

- | | |
|-----------------------------------|--------------------------|
| a. A can of soup | f. A saucepan |
| i. 3 L | i. 2 L |
| ii. 30 mL | ii. 20 L |
| iii. 300 mL | iii. 2 mL |
| b. A large container of ice cream | g. A dose of cough syrup |
| i. 5 L | i. 40 L |
| ii. 500 L | ii. 4 mL |
| iii. 50L | iii. 40 mL |
| c. A hot water heater | h. The gas tank of a car |
| i. 200 mL | i. 500 mL |
| ii. 50 L | ii. 5 L |
| iii. 200 L | iii. 50 L |
| d. A cup of tea | i. A jar of mustard |
| i. 18 mL | i. 150 mL |
| ii. 180 mL | ii. 15 L |
| iii. 218 L | iii. 15 mL |
| e. A garbage can | j. A large mixing bowl |
| i. 120 L | i. 6 mL |
| ii. 120 mL | ii. 60 L |
| iii. 12 L | iii. 6 L |

Answers to Exercise 8

- | | |
|--------|--------|
| a. iii | f. i |
| b. i | g. ii |
| c. iii | h. iii |
| d. ii | i. i |
| e. i | j. iii |

Measuring Mass

Mass is a measure of matter in something. The basic unit of measure for mass is the **gram (g)**. We buy sliced meats, bulk food, spices and cereal in grams.

We use **kilogram (kg)** to measure the mass of large things such as cars, people, flour and sugar. Can you think of two things that we buy in kilograms?

We use **milligram (mg)** to measure the mass of small things such as medicine or vitamins. A **milligram** is very small. Can you think of two things that we buy in milligrams?

Exercise 9

Circle the unit of measure you would use to measure each item. Check your work using the answer key at the end of the exercise

	Item	Unit of Measure
a)	Pasta	mg, g, kg
b)	Vitamin C	mg, g, kg
c)	Peanut butter	mg, g, kg
d)	Flour	mg, g, kg
e)	Dry dog food	mg, g, kg
f)	Cookies	mg, g, kg
g)	Apples	mg, g, kg
h)	Spices	mg, g, kg
i)	Cement	mg, g, kg
j)	Medicine tablets	mg, g, kg
k)	The family pet	mg, g, kg
l)	A coin	mg, g, kg

Answers to Exercise 9

- | | |
|------------|-------|
| a. g or kg | g. kg |
| b. mg | h. g |
| c. g or kg | i. kg |
| d. kg | j. mg |
| e. kg | k. kg |
| f. g | l. g |

Exercise 10

Circle the letter of the most reasonable unit of measure. Check your work using the answer key at the end of the exercise.

- | | | |
|-------------------------|---------------------|----------------------|
| a. A nickel | e. A dinner fork | i. A bag of potatoes |
| i. 5 kg | i. 50 g | i. 5 g |
| ii. 5 g | ii. 5 g | ii. 5 kg |
| iii. 50 g | iii. 5 kg | iii. 50 mg |
| b. A small television | f. A slice of bread | j. A car |
| i. 8 g | i. 2 g | i. 100 kg |
| ii. 8 kg | ii. 20 g | ii. 1000 kg |
| iii. 80 g | iii. 2 kg | iii. 10 kg |
| c. A flashlight battery | g. A sugar cube | k. A chocolate bar |
| i. 8 g | i. 2 mg | i. 300 mg |
| ii. 8 kg | ii. 20 g | ii. 300 mg |
| iii. 80 g | iii. 2 g | iii. 300 g |
| d. A baby | h. A refrigerator | l. A back pack |
| i. 30 kg | i. 120 g | i. 12 kg |
| ii. 3 kg | ii. 120 kg | ii. 12 g |
| iii. 300 kg | iii. 12 kg | iii. 12 mg |

Answers to Exercise 10

- | | | |
|-------|--------|--------|
| a. ii | e. i | i. ii |
| b. ii | f. ii | j. ii |
| c. i | g. iii | k. iii |
| d. ii | h. ii | l. i |

Metric Prefixes

In the metric system a prefix is used to tell if something is large or small. A **prefix** is a part of a word that is added to the start of word to change the meaning.

The base units of measure in the metric system are the **metre (m)**, **litre (L)** and **gram (g)**.

If the prefix **kilo** is added to one of the base units of measures, such as kilometre or kilogram, you know that these are large amounts.

A **kilometre** is 1 000 metres.

A **kilogram** is 1 000 grams.

If the prefix **centi** or **milli** is added to one of the base units of measure, such as centimetre or milligram, you know that these are small amounts.

It takes 100 **centimetres** to make a metre. It takes 1 000 **milligrams** to make a gram.

Measures	Large	Base	Small
Length	kilometre (km)	metre (m)	centimetre (cm) millimetre (mm)
Volume		litre (L)	millilitre (mL)
Mass	kilogram (kg)	gram (g)	milligram (mg)

Exercise 11

Write large, small or base on the line. Check your work using the answer key at the end of the exercise.

- | | |
|---------------------|---------------------|
| a. kilometre ____. | f. millimetre ____. |
| b. millimetre ____. | g. milligram ____. |
| c. metre ____. | h. kilogram ____. |
| d. gram ____. | i. centimetre ____. |
| e. litre ____. | |

Answers to Exercise 11

- | | |
|----------|----------|
| a. large | f. small |
| b. small | g. small |
| c. base | h. large |
| d. base | i. small |
| e. base | |

Exercise 12

Write the base unit of measure and then the prefix if one is needed. Check your work using the answer key at the end of the exercise.

	Item	Base	Prefix (if needed)
a)	Height of a tree		
b)	A bottle of vanilla		
c)	A cold tablet		
d)	Distance between Vancouver and Toronto		
e)	Thickness of a piece of paper		
f)	Length of your foot		
g)	Length of a piece of lumber		
h)	A bottle of hand lotion		
i)	A granola bar		
j)	Diameter of a DVD		
k)	Mass of a book		
l)	Water in a hot tub		
m)	Distance around the Earth		
n)	Gap in a spark plug		

Answers to Exercise 12

	Item	Base	Prefix (if needed)
a)	Height of a tree	m	
b)	A bottle of vanilla	L	milli
c)	A cold tablet	g	milli
d)	Distance between Vancouver and Toronto	m	kilo
e)	Thickness of a piece of paper	m	milli
f)	Length of your foot	m	centi
g)	Length of a piece of lumber	m	
h)	A bottle of hand lotion	L	milli
i)	A granola bar	g	
j)	Diameter of a DVD	m	centi
k)	Mass of a book	g	
l)	Water in a hot tub	L	
m)	Distance around the Earth	m	kilo
n)	Gap in a spark plug	m	milli

Exercise 13

Write the unit of measure you would use for each item below. Check your work using the answer key at the end of the exercise.

- | | |
|--|---------------------------------------|
| a. Coffee in a cup – <i>millilitres (mL)</i> | f. Thickness of glass |
| b. Bag of potatoes | g. Width of a page |
| c. Gas for a car | h. Box of cereal |
| d. Length of the hall | i. Distance from Vancouver to Halifax |
| e. Vitamin C tablet | j. Height of a child |

k. Can of soup

n. Length of a machine bolt

l. Window wash for the car

o. Cheese

m. Dose of heart medicine

Answers to Exercise 13

- a. Coffee in a cup – millilitres (mL)
- b. Bag of potatoes – kilogram (kg)
- c. Gas for a car – litre (L)
- d. Length of the hall – metre (m)
- e. Vitamin C tablet – milligram (mg)
- f. Thickness of glass – millimetre (mm)
- g. Width of a page – centimetre (cm)
- h. Box of cereal – gram (g)

- i. Distance from Vancouver to Halifax – kilometre (km)
- j. Height of a child – metre (m)
- k. Can of soup – millilitre (mL)
- l. Window wash for the car – litre (L)
- m. Dose of heart medicine – milligram (mg)
- n. Length of a machine bolt – millimetre (mm)
- o. Cheese – kilogram (kg)

Area of Rectangles and Squares

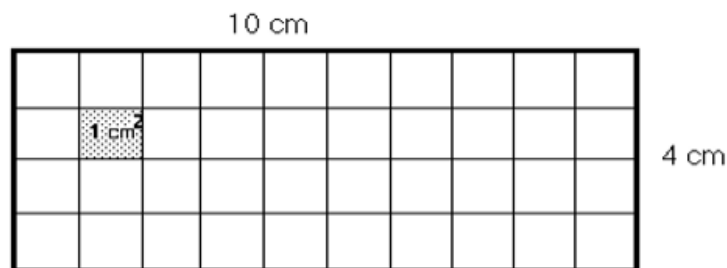
Area is the amount of surface within a figure. Area is described using *square units*.

For example,

- If the figure is a room, the **area** is the floor surface.
- If the figure is a tabletop, the area is the top surface of the table. If the figure is a roof, the area would be the shingled surface.
- If the figure is property, the area is the ground within the property lines.
- If the figure is this page, the area is the entire flat page that you are reading.

Example A

Find the area of this rectangle.



The measurements of this rectangle are given in centimetres. To measure the area, we will use squares which are 1 cm by 1 cm (**a square centimetre**). How many square centimetres will fit on the surface of this rectangle? Count the 1 cm squares drawn within the Example A rectangle.

The area of this rectangle is ____ square centimetres.

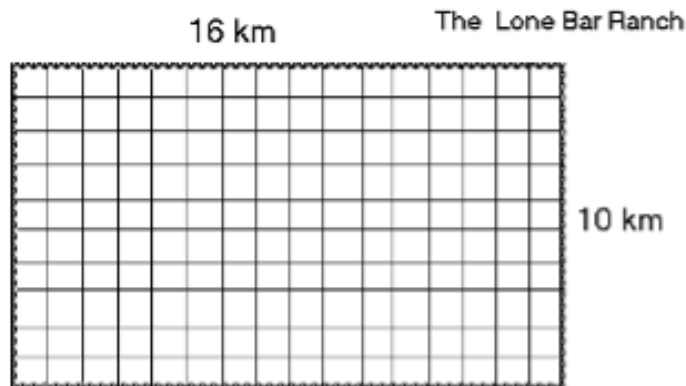
This is written as ____ cm^2

Square centimetres is usually written cm^2 which is said as “square centimetres” or “centimetres squared”. The small number is called an *exponent* and if the exponent is 2, it means multiplied by itself, so cm^2 means $\text{cm} \times \text{cm}$.

Square kilometres are written km^2 . Square metres are written m^2 .

Example B

This is a diagram of a large cattle ranch. The measurements of the ranch are shown as kilometres. What is the area of this ranch?



The square units to measure will be **square kilometres**. The area of this ranch will be the number of units 1 km by 1 km (km^2). The diagram shows how many square kilometres would fit in an area 16 km by 10 km. Count them. The area of the Lone Bar Ranch is ____ km^2 .

Did you find a quick method for counting the square units? Did you multiply the number of rows by the number of square kilometres in each row? The quick method of finding the area of a rectangle is to multiply the length by the width.

Use this formula **to find the area of a rectangle**:

$$\text{Area of a rectangle} = \text{length } (l) \times \text{width } (w)$$

Length times width can also be expressed as lw ,

$$\text{so } A_{\text{rectangle}} = lw$$

The answer **must** be expressed in square units.

Example C

Give the area of a soccer field that is 100 m by 45 m.

$$A_{\text{rectangle}} = lw$$

$$\text{Area of the soccer field} = 100 \text{ m} \times 45 \text{ m} = 4500 \text{ m}^2$$

Exercise 14

Find the area of the rectangles described below. The measures of the length (l) and the width (w) have been given. Draw and label a picture for each. Be sure to write the unit of measure for each answer.

a. $l = 10 \text{ cm}, w = 6 \text{ cm}$

e. $l = 196 \text{ cm}, w = 28 \text{ cm}$

b. $l = 100 \text{ km}, w = 70 \text{ km}$

f. $l = 82 \text{ km}, w = 12 \text{ km}$

c. $l = 400 \text{ km}, w = 100 \text{ km}$

g. $l = 60 \text{ cm}, w = 250 \text{ cm}$

d. $l = 975 \text{ cm}, w = 35 \text{ cm}$

h. $l = 90 \text{ cm}, w = 2 \text{ cm}$

Answers to Exercise 14

a. 60 cm^2

d. 34125 cm^2

g. 1500 cm^2

b. 7000 km^2

e. 5488 cm^2

h. 180 cm^2

c. 40000 km^2

f. 984 km^2

Squares are rectangles with all four sides congruent (the same length). So to find the area of a square you still use the same formula of multiplying the length times the width. But since the length and the width of a square are the same, you are multiplying the measure of the side (s) by itself. The formula for finding the area of a square is often written using an exponent.

$$A_{\text{square}} = s^2$$

For example, to find the area of a square piece of property, multiply the length of one side by itself. If the measure of one side of a property is 75 m,

$$\text{Area of this piece of property: } 75^2 = 75 \text{ m} \times 75 \text{ m} = 5625 \text{ m}^2$$

Exercise 15

Find the area of the squares. The measure of the side has been given. Draw and label a picture for each. Be sure to write the unit of measure for each answer.

a. A_{square} , if $s = 5 \text{ cm}$

d. A_{square} , if $s = 100 \text{ m}$

b. A_{square} , if $s = 125 \text{ km}$

e. A_{square} , if $s = 14 \text{ km}$

c. A_{square} , if $s = 4 \text{ mm}$

f. A_{square} , if $s = 25 \text{ cm}$

- c. A rectangular board is 58 cm wide and 64 cm long. How much area will this board cover?
- d. Kyoko bought some curtain material that is 198 cm long and 40 cm wide. How many square centimetres of material did she buy?
- e. The distance between bases of a baseball diamond (a square) is 27 m. What is the area of the baseball diamond?

- f. The janitor waxed the floor that was 24 m long and 18 m wide. How many square metres of floor did he wax?

Answers to Exercise 16

a. 680 m^2

b. 2500 m^2

c. 3712 cm^2

d. 7920 cm^2

e. 729 m^2

f. 432 m^2

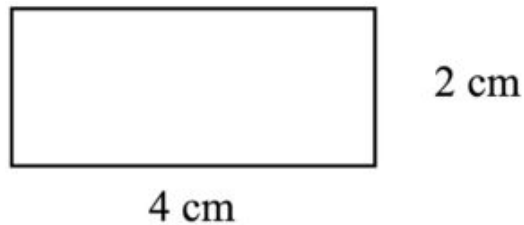
Perimeter and Area of Rectangles and Squares

Rectangles

Perimeter means **distance around**. To find the **perimeter** of a rectangle, use the formula

$$P = 2 \times \text{length} + 2 \times \text{width}.$$

Example D



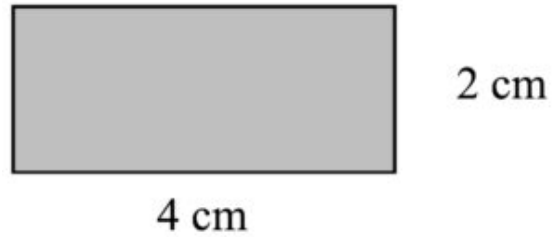
$$\begin{aligned} P &= 2 \times \text{length} + 2 \times \text{width} \\ &= 2 \times 4 \text{ cm} + 2 \times 2 \text{ cm} \\ &= 8 \text{ cm} + 4 \text{ cm} \\ &= 12 \text{ cm} \end{aligned}$$

Remember: Multiply first and then add.

Area means **the amount of surface within a shape**. To find the **area** of a rectangle, use the formula

$$A = \text{length} \times \text{width}$$

Example E

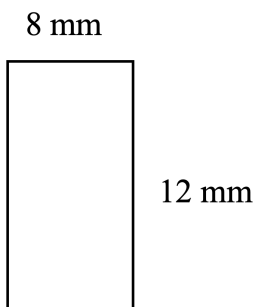


$$\begin{aligned} A &= \text{length} \times \text{width} \\ &= 4 \text{ cm} \times 2 \text{ cm} \\ &= 8 \text{ cm}^2 \end{aligned}$$

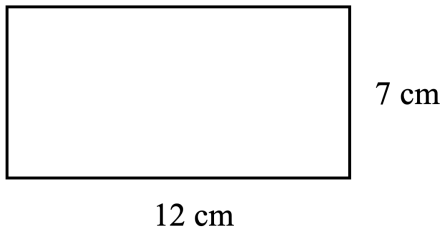
Exercise 17

For each rectangle, find both the perimeter (distance around) and the area (amount of surface within). Check your work using the answer key at the end of the exercise.

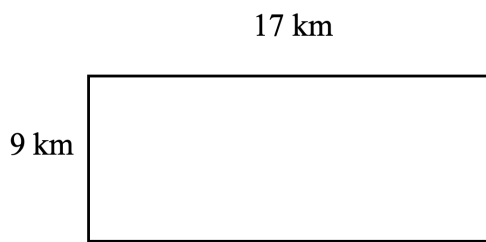
a.



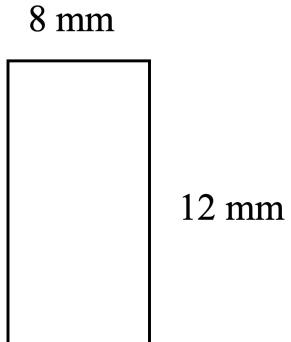
b.



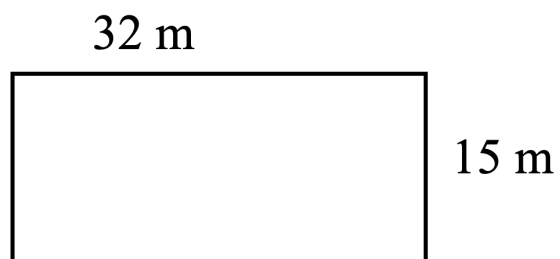
c.



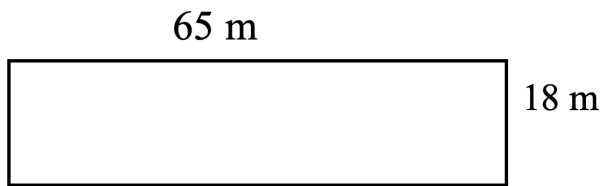
d.



e.



f.



g. Raoul's lot is shaped like a rectangle. If it is 55 m long and 15 m wide, what is the perimeter and area of his lot?

h. The playground is shaped like a rectangle. Its length is 140 m and its width is 60 m. What is the perimeter and area of the playground?

Answers to Exercise 17

a. $P = 40 \text{ m}, A = 96 \text{ m}^2$

b. $P = 38 \text{ cm}, A = 84 \text{ cm}^2$

c. $P = 52 \text{ km}, A = 153 \text{ km}^2$

d. $P = 40 \text{ mm}, A = 96 \text{ mm}^2$

e. $P = 94 \text{ m}, A = 480 \text{ m}^2$

f. $P = 166 \text{ m}, A = 1\,170 \text{ m}^2$

g. $P = 140 \text{ m}, A = 825 \text{ m}^2$

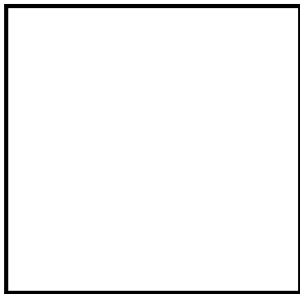
h. $P = 400 \text{ m}, A = 8\,400 \text{ m}^2$

Squares

Perimeter means **distance around**. To find the **perimeter** of a square, use the formula

$$P = 4 \times \text{side} \text{ or } P_{\text{square}} = 4s$$

Example F



9 cm

$$\begin{aligned} P &= 4 \times \text{side} \\ &= 4 \times 9 \text{ cm} \\ &= 36 \text{ cm} \end{aligned}$$

Area means **the amount of surface within a shape**. To find the **area** of a square, use the formula

$$A = \text{side}^2 \text{ or } A_{\text{square}} = s^2$$

Example G



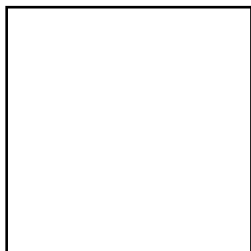
4 cm

$$\begin{aligned} A &= \text{side}^2 \\ &= (4 \text{ cm})^2 \\ &= 16 \text{ cm}^2 \end{aligned}$$

Exercise 18

For each square, find both the perimeter (distance around) and the area (amount of surface within). Check your work using the answer key at the end of the exercise.

a.



5 m

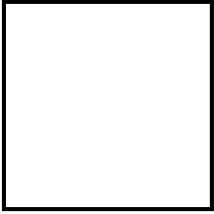
b.



9 cm

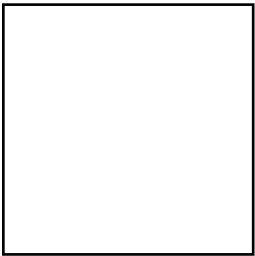
c.

15 cm



d.

38 cm

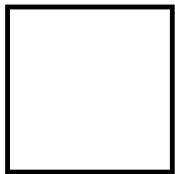


e.



42 cm

f.



57 mm

g. Luisa bought a 115 cm square tablecloth. What is the perimeter and area of the tablecloth?

h. Liang bought a square tarp whose side was 31 m. What is the perimeter and area of the tarp?

Answers to Exercise 18

a. $P = 20 \text{ m}$, $A = 25 \text{ m}^2$

b. $P = 36 \text{ cm}$, $A = 81 \text{ cm}^2$

c. $P = 60 \text{ cm}$, $A = 225 \text{ cm}^2$

d. $P = 152 \text{ cm}$, $A = 1\,444 \text{ cm}^2$

e. $P = 168 \text{ cm}$, $A = 1\,764 \text{ cm}^2$

f. $P = 288 \text{ mm}$, $A = 3\,249 \text{ mm}^2$

g. $P = 460 \text{ cm}$, $A = 13\,225 \text{ cm}^2$

h. $P = 124 \text{ m}$, $A = 961 \text{ m}^2$

Topic C: Self Test

Mark /38 Aim 30/38

A. For each item, circle the unit of measure you would use. (8 marks)

	Item	Unit of Measure
a)	Height of a doorknob above the floor	m, cm, mm, km
b)	Thickness of a piece of wire	m, cm, mm, km
c)	Length of a ski	m, cm, mm, km
d)	Thickness of a piece of string	m, cm, mm, km
e)	Height of a fence	m, cm, mm, km
f)	Length of a finger	m, cm, mm, km
g)	Length of a football field	m, cm, mm, km
h)	How far you travelled on your holiday	m, cm, mm, km

B. Circle the letter of the most reasonable measure. (6 marks)

a. Storage box

- i. 66 mL
- ii. 66 L
- iii. 6 L

b. Baby Shampoo

- i. 593 mL
- ii. 593 L
- iii. 59 L

c. Antifreeze

- i. 40 L
- ii. 4 L
- iii. 40 mL

d. Wastebasket

- i. 42 mL
- ii. 4 L
- iii. 42 mL

e. Deodorant

- i. 354 L
- ii. 35 mL
- iii. 354 mL

f. Liquid laundry soap

- i. 975 mL
- ii. 97 L
- iii. 975 L

C. Circle the unit of measure you would use. (6 marks)

	Item	Unit of Measure
a)	Can of peanuts	mg, g, kg
b)	Cat litter	mg, g, kg
c)	An antacid tablet	mg, g, kg
d)	Bag of potato chips	mg, g, kg

D. Fill in the chart with the right metric prefix. (6 marks)

Small	Base	Large

e. A fish

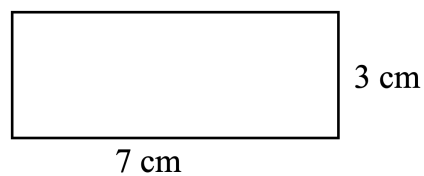
- i. 5g
- ii. 5 mg
- iii. 5 kg

f. A bar of soap

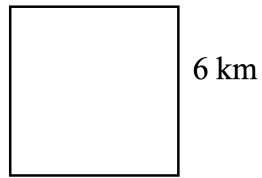
- i. 90 mg
- ii. 90 kg
- iii. 90 g

E. Find the perimeter and area for each shape. (12 marks)

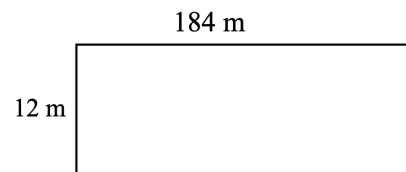
a.



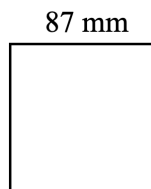
b.



c.



d.



e. A double size bed cover measures 135 cm wide and 190 cm. What is the perimeter and area of the bed cover?

f. An Olympic size swimming is 50 m long and 25 m wide. What is the perimeter and area of the swimming pool?

Answers to Topic C Self-Test

A.

- | | |
|-------|------------|
| a. cm | e. m or cm |
| b. mm | f. cm |
| c. cm | g. m |
| d. mm | h. km |

B.

- | | |
|-------|--------|
| a. ii | d. ii |
| b. i | e. iii |
| c. ii | f. i |

C.

- | | |
|-------|--------|
| a. g | d. g |
| b. kg | e. iii |
| c. mg | f. iii |

D.

Small	Base	Large
milli	Litre	
milli	metre	kilo
milli	gram	kilo

E.

- | | |
|--|---|
| a. $P = 20 \text{ cm}, A = 21 \text{ cm}^2$ | d. $P = 348 \text{ mm}, A = 7\,569 \text{ mm}^2$ |
| b. $P = 24 \text{ km}, A = 36 \text{ km}^2$ | e. $P = 650 \text{ cm}, A = 25\,650 \text{ cm}^2$ |
| c. $P = 410 \text{ m}, A = 3\,864 \text{ m}^2$ | f. $P = 150 \text{ m}, A = 1\,250 \text{ m}^2$ |

Unit 3 Review: Change and the Metric System

You will now practice all the skills you learned in Unit 3. Check your work using the answer key at the end of the review

A. Circle the number of coins or bills you would need to get from the first number to the second number. Make sure to use the least number of coins or bills.

a. \$48 to \$50



b. \$59 to \$60



c. \$73 to \$80



d. \$33 to \$40



B. State the number and kind of coins and bills you would need to get from the first number to the second number. Make sure you use the least number of coins and bills as possible.

a. \$23 to \$25

c. \$85 to \$90

b. \$31 to \$35

d. \$70 to \$90

c.

\$20.31 to \$40

Need	To get to

d.

\$72.18 to \$100

Need	To get to

E. State the number and kind of coins and bills you would need to get change from \$100. Make sure you use the least number of coins and bills as possible.



a.

printer for \$78.36



b.

cordless phone for \$55.65

c. Mrs. Kono bought a new cordless kettle for \$44.78. How much change will Mrs. Kono get from \$100?

F. Circle the letter of the most reasonable measure.

- | | |
|-----------------------------------|---------------------------|
| a. Diameter of a hockey puck | c. Thickness of a blanket |
| i. 76 mm | i. 10 m |
| ii. 76 m | ii. 10 cm |
| iii. 76 cm | iii. 10 mm |
| b. Distance from the mall to home | d. Height of a tree |
| i. 10 km | i. 28 mm |
| ii. 10 m | ii. 28 m |
| iii. 10 cm | iii. 28 cm |

G. Choose the most reasonable measure.

- a. Carlos drinks
- i. 500 L of milk
 - ii. 500 mL of milk
 - iii. 5 mL of milk
- b. A thermos holds
- i. 360 mL
 - ii. 360 L
 - iii. 36 L
- c. A swimming pool holds 3758 ____ of water
- d. A tube of lotion is 50 ____.

H. Choose the most reasonable measure.

- a. A dog weighs
- i. 17 g
 - ii. 17 kg
 - iii. 17 mg

b. A nickel has a mass of

- i. 5 g
- ii. 5 mg
- iii. 5 kg

c. A paper clip has mass of

- i. 1 kg
- ii. 1 mg
- iii. 1 g

d. Six math books have mass of

- i. 2 kg
- ii. 2 mg
- iii. 2 g

e. Elena took 400 ____ of vitamin A

f. Suki bought 10 ____ of potatoes

I. Write the base unit of measure and then the prefix if one is needed.

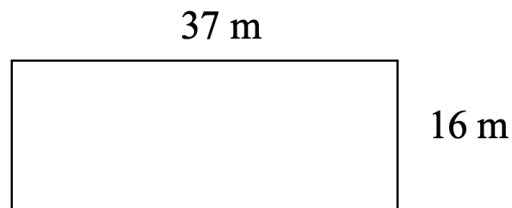
	Item	Base	Prefix (if needed)
a)	Length of a garden hose		
b)	A bottle of olive oil		
c)	A child's multivitamin		
d)	Distance between Jupiter and Mars		
e)	Thickness of a kleenex		

J. Write the unit of measure you would use for each item below.

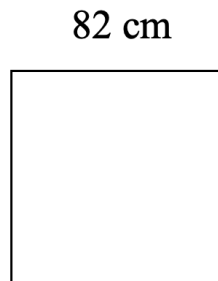
- a. Paint thinner
- b. Cat litter
- c. Deodorant
- d. Length of the street
- e. Aspirin

K. Find the area of each shape.

a.



b.

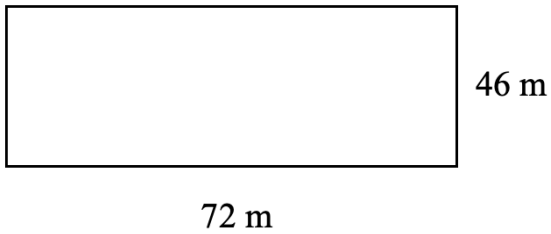


c. Red Square in Moscow measures 330 m long and 70 m wide. What is the area of Red Square?

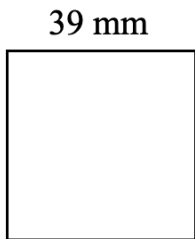
d. Yoshiro is going to build a square patio whose side is 23 What is the area of the patio?

L. Find the perimeter and area of each shape.

a.



b.



c. Nadal wants to fence his garden. It is 15 m wide and 26 m long. How much fencing does Nadal need? How much space does Nadal have to plant a garden?

d. Yolanda would like to buy fencing and sod for her new lawn that is 54 m long and 42 m wide. How much fencing does she need? How much sod does she need?

Answers to Unit 3 Review

A. Circle the number of coins or bills you would need.

- a. 1 toonie
- b. 1 loonie
- c. 1 toonie, 1 \$5 bill
- d. 1 toonie, 1 \$5 bill

B. State the number and kind of coins and bills you would need.

- A. 1 toonie
- B. 2 toonies
- C. 1 \$5 bill
- D. 1 \$20 bill

C. State the number and kind of coins and bills you would need.

a. **\$37 to \$50**

Need	To get to
1 loonie	\$38
1 toonie	\$40
1 \$10 bill	\$50

c. **\$77 to \$100**

Need	To get to
1 loonie	\$78
1 toonie	\$80
1 \$20 bill	\$100

b. **\$53 to \$60**

Need	To get to
1 toonie	\$55
1 \$5 bill	\$60

d. **\$21 to \$50**

Need	To get to
2 toonies	\$25
1 \$5 bill	\$30
1 \$20 bill	\$50

D. State the number and kind of coins and bills you would need.

a.

\$63.54 to \$80

Need	To get to
1 penny	\$63.55
2 dimes	\$63.75
1 quarter	\$64
1 loonie	\$65
1 \$5 bill	\$70
1 \$10 bill	\$80

c.

\$20.31 to \$40

Need	To get to
2 pennies	\$32.65
1 dime	\$32.75
1 quarter	\$33
1 toonie	\$35
1 \$5 bill	\$40
1 – \$10	\$50

b.

\$32.63

Need	To get to
4 pennies	\$20.35
1 nickel	\$20.40
1 dime	\$20.50
2 quarters	\$21
2 toonies	\$25
1 \$5 bill	\$30
1 \$10 bill	\$40

d.

\$72.18 to \$100

Need	To get to
2 pennies	\$72.20
1 nickel	\$72.25
3 quarters	\$73
1 toonie	\$75
1 \$5 bill	\$80
1 \$20 bill	\$100

E. State the number and kind of coins and bills you would need.

- 4 pennies, 1 dime, 2 quarters, 1 loonie, 1 \$20 bill
- 1 dime, 1 quarter, 2 toonies, 2 \$20 bill
- 2 pennies, 2 dimes, 1 \$5 bill, 1 \$10 bill, 2 \$20 bill

F. Circle the letter of the most reasonable measure.

- i
- i
- iii
- ii

G. Choose the most reasonable measure.

- ii
- ii
- L
- mL

H. Choose the most reasonable measure.

- a. ii
- b. i
- c. iii
- d. i
- e. mg
- f. kg

I. Write the base unit of measure and then the prefix if one is needed.

	Item	Base	Prefix (if needed)
a)	Length of a garden hose	m	
b)	A bottle of olive oil	L	milli
c)	A child's multivitamin	g	milli
d)	Distance between Jupiter and Mars	m	kilo
e)	Thickness of a kleenex	m	milli

J. Write the unit of measure you would use for each item below.

- a. Paint thinner
- b. Cat litter
- c. Deodorant
- d. Length of the street
- e. Aspirin

K. Find the area of each shape.

a. $A = 592 \text{ m}^2$

b. $A = 6724 \text{ cm}^2$

c. $A = 23100 \text{ m}^2$

d. $A = 529 \text{ m}^2$

L. Find the perimeter and area of each shape.

a. $P = 236$ m, $A = 3312m^2$

c. $P = 82$ m, $A = 390$ m²

b. $P = 156$ mm, $A = 1521$ mm²

d. $P = 192$ m, $A = 2268$ m²

CONGRATULATIONS!!

Now you have finished Unit 3.

TEST TIME!

Ask your instructor for the practice test for this unit.

Once you've done the practice test, you need to do the unit 3 test. Again, ask your instructor for this.

Good luck!

Book 3 Final Review

Book 3 Final Review

You will now practice all the skills you learned in Book 3. Check your work using the answer key at the end of the review.

If you can't remember how to do a question, go back to the lesson on this topic to refresh your memory. The unit and topic for each question are listed.

Example: **1-B** means Unit 1, Topic B

1-A

A. Find the products.

a.
$$\begin{array}{r} 4 \\ \times 9 \\ \hline \end{array}$$

d.
$$\begin{array}{r} 9 \\ \times 5 \\ \hline \end{array}$$

g.
$$\begin{array}{r} 8 \\ \times 4 \\ \hline \end{array}$$

b.
$$\begin{array}{r} 7 \\ \times 8 \\ \hline \end{array}$$

e.
$$\begin{array}{r} 6 \\ \times 10 \\ \hline \end{array}$$

h.
$$\begin{array}{r} 5 \\ \times 2 \\ \hline \end{array}$$

c.
$$\begin{array}{r} 2 \\ \times 6 \\ \hline \end{array}$$

f.
$$\begin{array}{r} 0 \\ \times 3 \\ \hline \end{array}$$

i.
$$\begin{array}{r} 10 \\ \times 10 \\ \hline \end{array}$$

1-B

B. Find the products.

a.
$$\begin{array}{r} 71 \\ \times 3 \\ \hline \end{array}$$

c.
$$\begin{array}{r} 8431 \\ \times 2 \\ \hline \end{array}$$

b.
$$\begin{array}{r} 623 \\ \times 3 \\ \hline \end{array}$$

d.
$$\begin{array}{r} 5231 \\ \times 3 \\ \hline \end{array}$$

C. Find the products.

a.
$$\begin{array}{r} 68 \\ \times 5 \\ \hline \end{array}$$

c.
$$\begin{array}{r} 9346 \\ \times 7 \\ \hline \end{array}$$

b.
$$\begin{array}{r} 457 \\ \times 6 \\ \hline \end{array}$$

d.
$$\begin{array}{r} 1329 \\ \times 4 \\ \hline \end{array}$$

D. Find the products.

$$\begin{array}{r} \text{a.} \quad 45 \\ \times 26 \\ \hline \end{array}$$

$$\begin{array}{r} \text{c.} \quad 3829 \\ \times 52 \\ \hline \end{array}$$

$$\begin{array}{r} \text{e.} \quad 6314 \\ \times 231 \\ \hline \end{array}$$

$$\begin{array}{r} \text{b.} \quad 542 \\ \times 38 \\ \hline \end{array}$$

$$\begin{array}{r} \text{d.} \quad 463 \\ \times 179 \\ \hline \end{array}$$

$$\begin{array}{r} \text{f.} \quad 1425 \\ \times 537 \\ \hline \end{array}$$

E. Find the products. Use the shortcut.

$$\begin{array}{r} \text{a.} \quad 1000 \\ \times 792 \\ \hline \end{array}$$

$$\text{d. } 3609 \times 10 =$$

$$\begin{array}{r} \text{b.} \quad 9264 \\ \times 100 \\ \hline \end{array}$$

$$\text{e. } 100 \times 259 =$$

$$\begin{array}{r} \text{c.} \quad 1000 \\ \times 85 \\ \hline \end{array}$$

$$\text{f. } 10 \times 46 =$$

$$\text{g. } 5719 \times 1000 =$$

1-C

F. Find an estimated product.

a.
$$\begin{array}{r} 72 \\ \times 38 \\ \hline \end{array}$$

d.
$$\begin{array}{r} 792 \\ \times 901 \\ \hline \end{array}$$

b.
$$\begin{array}{r} 574 \\ \times 83 \\ \hline \end{array}$$

e.
$$\begin{array}{r} 8560 \\ \times 193 \\ \hline \end{array}$$

c.
$$\begin{array}{r} 5492 \\ \times 87 \\ \hline \end{array}$$

f.
$$\begin{array}{r} 29492 \\ \times 585 \\ \hline \end{array}$$

1-D

G. Word Problems.

- a. The Great Belt Suspension Bridge in Denmark is 1 624 metres How many metres will 24 trucks travel crossing the bridge?
- b. How many cans of peaches are needed to pack 300 boxes if each box has 3 rows and each row has 6 cans? (2 step question)
- c. The Krubera Cave in Georgia is the deepest cave in the world at 2 191 metres. Estimate how many metres 348 visitors will cover going down to the cave.

2-A

H. Complete this chart.

	Multiplication	Division	Division	“Say”
a)	$3 \times 8 = 24$ $8 \times 3 = 24$	$24 \div 8 = 3$ $24 \div 3 = 8$	$\begin{array}{r} 3 \\ 8 \overline{)24} \\ \underline{24} \\ 0 \end{array}$ $\begin{array}{r} 8 \\ 3 \overline{)24} \\ \underline{24} \\ 0 \end{array}$	“24 divided by 8 is 3” “24 divided by 3 is 8”
b)	$7 \times 5 = 35$			
c)	$9 \times 3 = 27$			

I. Give the answer.

a. $28 \div 4 =$

c. $64 \div 8 =$

e. $5 \overline{)40}$

b. $18 \div 6 =$

d. $9 \overline{)81}$

f. $3 \overline{)32}$

J. Find the quotients.

a. $8\overline{)60}$

c. $9\overline{)43}$

b. $5\overline{)49}$

d. $3\overline{)19}$

2-B

K. Using the following list of numbers, answer questions a, b, c and d.

96

345

3 816

6 815

38 433

95 373

a. Which numbers are divisible by 2?

b. Which numbers are divisible by 3?

c. Which numbers are divisible by 5?

d. Which numbers are divisible by 9?

2-C

L. Find the quotients.

a. $3\overline{)963}$

c. $4\overline{)844}$

b. $2\overline{)682}$

d. $5\overline{)550}$

M. Find the quotients.

a. $9\overline{)387}$

c. $5\overline{)915}$

b. $6\overline{)492}$

d. $7\overline{)469}$

N. Find the quotients.

a. $8\overline{)832}$

c. $3\overline{)927}$

b. $4\overline{)836}$

d. $2\overline{)416}$

O. Find the quotients.

a. $5\overline{)92}$

c. $4\overline{)73}$

b. $7\overline{)86}$

d. $6\overline{)91}$

P. Find the quotients.

a. $3\overline{)851}$

c. $2\overline{)407}$

b. $8\overline{)509}$

d. $7\overline{)954}$

2-D

Q. Find the quotients.

a. $24\overline{)480}$

c. $36\overline{)1944}$

b. $58\overline{)928}$

d. $73\overline{)37668}$

R. Find the quotients.

a. $10 \overline{)683}$

c. $100 \overline{)13041}$

b. $1000 \overline{)41839}$

d. $1000 \overline{)63125}$

S. Find the quotients.

a. $348 \overline{)8010}$

c. $753 \overline{)619345}$

b. $483 \overline{)27150}$

d. $73 \overline{)37668}$

2-E

T. Give an estimated quotient. Show your rounding where needed.

a. $30 \overline{)63000}$

d. $438 \overline{)23689}$

b. $7000 \overline{)8400000}$

e. $768 \overline{)63875}$

c. $58 \overline{)2894}$

f. $896 \overline{)80986}$

2-F

U. Word problems.

- a. A satellite orbits the moon every 58 minutes. How many complete orbits does it make 6 728 minutes?

b. If it takes 73 hours to make a snow blower. How many snow blowers can be made in 47 815 hours?

c. There were 10 780 tickets sold at the game. There were 150 tickets in each roll. How many complete rolls of tickets were used? How many were sold from the next roll?

V. Solve the cost per unit price.

a. 6 packages of rice for \$12

b. 2 tubs of yogurt for \$8

W. Solve the unit price and then underline the best buy.

a. Dog food

8 kilograms for \$16 or 15 kilograms for \$45

b. Movies

9 movies for \$162 or 3 movies for \$48

3-B

X. Circle the number of coins or bills you would need to get from the first number to the second number. Make sure to use the least number of coins or bills.

a. \$58 to \$60



b. \$41 to \$50



c. \$78 to \$90



Y. State the number and kind of coins and bills you would need to get from the first number to the second number. Make sure you use the least number of coins and bills as possible.

a. \$38 to \$40

b. \$21 to \$40

c. \$76 to \$100

Z. State the number and kind of coins and bills you would need to get change from the second number. Make sure you use the least number of coins and bills as possible.

a.

\$43 to \$100

Need	To get to

c.

\$58.37 to \$100

Need	To get to

b.

\$23 to \$80

Need	To get to

d.

\$62.71 to \$100

Need	To get to

AA. State the number and kind of coins and bills you would need to get change from \$100. Make sure you use the least number of coins and bills as possible.



a.

Bread maker for \$61.59



b.

Shop vacuum cleaner for \$84.43

c. Mrs. Chui bought building blocks for \$33.44. How much change will she get from \$100?

3-C

AB. Circle the letter of the most reasonable measure.

- | | |
|------------------------|------------------------------------|
| a. Depth of the ocean | c. Distance from the earth to moon |
| i. 3 926 mm | i. 3 476 m |
| ii. 3 926 km | ii. 3 476 mm |
| iii. 3 926 m | iii. 3 476 km |
| b. Thickness of string | d. Length of a banana |
| i. 5 mm | i. 15 km |
| ii. 5 cm | ii. 15 mm |
| iii. 5 m | iii. 15 cm |

AC. Choose the most reasonable measure.

- | | |
|---|-----------------------------|
| a. A spoonful of medicine | b. A bottle of orange juice |
| i. 5 L | i. 4 mL |
| ii. 5 mL | ii. 4 L |
| iii. 50 mL | iii. 40 L |
| c. A tube of toothpaste holds 130 ____. | |
| d. The gas tank of a car holds 70 ____. | |

AD. Choose the most reasonable measure.

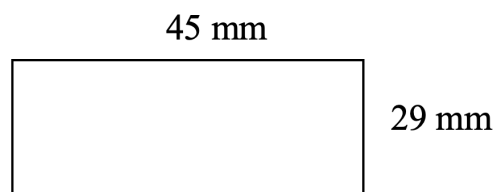
- | | |
|---|-----------------|
| a. A sugar cube has a mass of | b. A cat weighs |
| i. 1 g | i. 7 mg |
| ii. 10 g | ii. 7 kg |
| iii. 10 kg | iii. 7 g |
| c. A headache pill has 375 ____ of medicine | |

AE. Write the base unit of measure and then the prefix if one is needed.

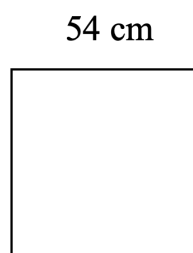
	Item	Base	Prefix (if needed)
a)	Thickness of a rope		
b)	Water in a bathtub		
c)	A bag of rice		
d)	Length of a table		

AF. Find the area of each shape.

a.

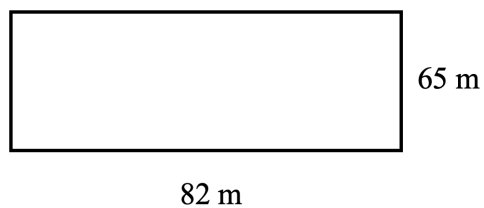


b.

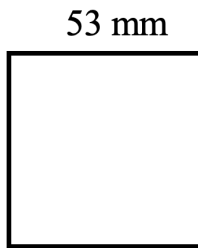


AG. Find the perimeter and area of each shape

a.



b.



c. Tiananmen Square measures 880 metres by 500 metres Find the perimeter and area of Tiananmen.

d. Andr e wants to build a square patio whose side is 13. Find the perimeter and area of her new patio.

Answers to Book 3 Review

A.

- | | | |
|-------|-------|--------|
| a. 36 | d. 45 | g. 32 |
| b. 56 | e. 60 | h. 10 |
| c. 12 | f. 0 | i. 100 |

B.

- | | |
|----------|-----------|
| a. 213 | c. 16 862 |
| b. 1 869 | d. 15 693 |

C.

- | | |
|----------|-----------|
| a. 340 | c. 65 422 |
| b. 2 742 | d. 5 316 |

D.

- | | |
|-----------|------------|
| a. 1 170 | c. 199 108 |
| b. 20 596 | d. 82 877 |

E.

- | | |
|------------|--------------|
| a. 792 000 | e. 25 900 |
| b. 926 400 | f. 460 |
| c. 85 000 | g. 5 719 000 |
| d. 36 090 | |

F.

- | | |
|------------------------------|----------------------------------|
| a. $70 \times 40 = 2800$ | d. $800 \times 900 = 720000$ |
| b. $600 \times 80 = 48000$ | e. $9000 \times 200 = 1800000$ |
| c. $5000 \times 90 = 450000$ | f. $30000 \times 600 = 18000000$ |

G.

- | | |
|------------------|---------------|
| a. 38 976 metres | b. 5 400 cans |
|------------------|---------------|

c. 600 000 metres

H.

	Multiplication	Division	Division	“Say”
a)	$3 \times 8 = 24$ $8 \times 3 = 24$	$24 \div 8 = 3$ $24 \div 3 = 8$	$\begin{array}{r} 3 \quad 8 \\ 8 \overline{)24} \quad 3 \overline{)24} \end{array}$	“24 divided by 8 is 3” “24 divided by 3 is 8”
b)	$7 \times 5 = 35$ $5 \times 7 = 35$	$35 \div 5 = 7$ $35 \div 7 = 5$	$\begin{array}{r} 7 \quad 5 \\ 5 \overline{)35} \quad 7 \overline{)35} \end{array}$	“35 divided by 5 is 7” “35 divided by 7 is 5”
c)	$9 \times 3 = 27$ $3 \times 9 = 27$	$27 \div 3 = 9$ $27 \div 9 = 3$	$\begin{array}{r} 9 \quad 3 \\ 3 \overline{)27} \quad 9 \overline{)27} \end{array}$	“27 divided by 3 is 9” “27 divided by 9 is 3”

I.

- | | |
|------|------|
| a. 7 | d. 9 |
| b. 3 | e. 8 |
| c. 8 | f. 7 |

J.

- | | |
|---------|---------|
| a. 7 R4 | c. 4 R7 |
| b. 9 R4 | d. 6 R1 |

K.

- | | |
|----------------------------------|------------------|
| a. 96, 3 816 | c. 345, 6 815 |
| b. 96, 345, 3 816, 38 433, 95373 | d. 3 816, 95 373 |

L.

- | | |
|--------|--------|
| a. 321 | c. 211 |
| b. 341 | d. 110 |

M.

- a. 43
- b. 82
- c. 183
- d. 67

N.

- a. 104
- b. 209
- c. 309
- d. 208

O.

- a. 18 R2
- b. 12 R2
- c. 18 R1
- d. 15 R1

P.

- a. 283 R2
- b. 63 R5
- c. 203 R1
- d. 136 R2

Q.

- a. 20
- b. 16
- c. 54
- d. 516

R.

- a. 68 R3
- b. 418 R839
- c. 130 R41
- d. 63 R125

S.

- a. 23 R6
- b. 56 R102
- c. 822 R379
- d. 516

T.

- a. 2100
- b. 1200
- c. $30000 \div 60 = 50$
- d. $24000 \div 400 = 60$
- e. $64000 \div 800 = 80$
- f. $81000 \div 900 = 90$

U.

- a. 116 orbits
- b. 655 snow blowers
- c. 71 full rolls, 130 tickets

V.

- a. \$2
- b. \$4

W.

- a. \$2, \$3, best buy is 8 kilograms for \$16
- b. \$18, \$16, best buy is 3 movies for \$48

X.

- a. 1 toonie
- b. 2 toonies, 1 \$5 bill
- c. 1 toonie, 1 \$10 bill

Y.

- a. 1 toonie
- b. 2 toonies, 1 \$5 bill, 1 \$10 bill
- c. 2 toonies, 1 \$20 bill

Z.

a. **\$43 to \$100**

Need	To get to
1 toonie	\$45
1 \$5 bill	\$50
1 \$10 bill	\$60
2 \$20 bills	\$100

b. **\$23 to \$80**

Need	To get to
1 toonie	\$25
1 \$5 bill	\$30
1 \$10 bill	\$40
2 \$20 bill	\$80

c.

\$58.37 to \$100

Need	To get to
3 pennies	\$58.40
1 dime	\$58.50
2 quarters	\$59.00
1 loonie	\$60.00
2 \$20 bill	\$100.00

d.

\$62.71 to \$100

Need	To get to
4 pennies	\$62.75
1 quarter	\$63.00
1 toonie	\$65.00
1 \$5 bill	\$70.00
1 \$10 bill	\$80.00
1 \$20 bill	\$100.00

AA.

- a. 1 penny, 1 nickel, 1 dime, 1 quarter, 1 loonie, 1 toonie, 1 \$5 bill, 1 \$10 bill, 1 \$20 bill
- b. 2 pennies, 1 nickel, 2 quarters, 1 \$5 bill, 1 \$10 bill
- c. 1 penny, 1 nickel, 2 quarters, 1 loonie, 1 \$5 bill, 3 \$20 bill

AB.

- a. iii
- b. i
- c. iii
- d. iii

AC.

- a. ii
- b. ii
- c. mL
- d. L

AD.

- a. i
- b. ii
- c. mg

AE.

	Item	Base	Prefix (if needed)
a)	Thickness of a rope	m	m
b)	Water in a bathtub	L	
c)	A bag of rice	g	k
d)	Length of a table	m	c

AF.

a. 1305 mm^2

b. 2916 cm^2

AG.

a. $P = 294 \text{ m}, A = 5330 \text{ m}^2$

c. $P = 2760 \text{ m}, A = 440000 \text{ m}^2$

b. $P = 212 \text{ mm}, A = 2809 \text{ mm}^2$

d. $P = 52 \text{ m}, A = 169 \text{ m}^2$

CONGRATULATIONS!!

Now you have finished Book 3 Final Review.

TEST TIME!

Ask your instructor for the practice test.

Once you've done the practice test, you need to do the Book 3 Final Review test. Again, ask your instructor for this.

Good luck!