

## CHAPTER 6

## 1

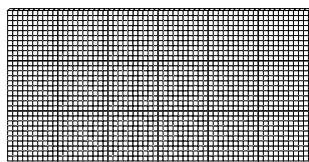
## Multiplying Tens

**Goal** Use number facts to multiply by tens.

1. What number facts can you use to calculate these answers? Find the answers.

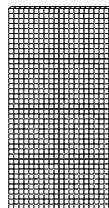
	Number fact	Answer
a) $40 \times 30$	$4 \times 3 = 12$	1200
b) $50 \times 70$	$5 \times 7 = 35$	3500
c) $60 \times 20$	$6 \times 2 = 12$	1200
d) $90 \times 80$	$9 \times 8 = 72$	7200

2. How can you use this array to calculate  $30 \times 60$ ? Find the product.



1800. Use the array to multiply  $3 \times 6$ .

3. Use the array to multiply  $40 \times 20$ .



800

### At-Home Help

A **product** is the answer to a multiplication question.

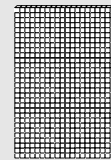
For example, 66 is the product of  $11 \times 6$ .

$$11 \times 6 = 66$$

When you multiply tens, it is easier to use multiplication facts for the non-zero digits.

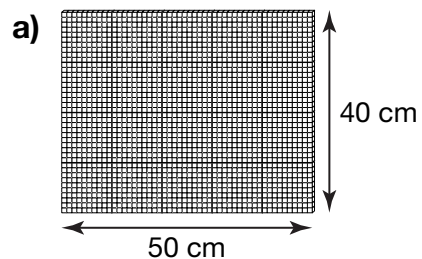
For example, to multiply  $30 \times 20$  use the multiplication fact  $3 \times 2 = 6$ .

An array can help with multiplication.

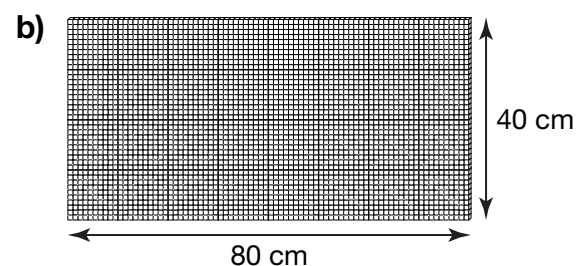


$$30 \times 20 = 600$$

4. Calculate the area of each rectangle.



2000 square centimetres



3200 square centimetres

5. Calculate each product. Explain your thinking.

a)  $30 \times 60 =$  1800

Explanation

I used multiplication fact  $3 \times 6 = 18$ .

b)  $70 \times 40 =$  2800

I used multiplication fact  $7 \times 4 = 28$ .

## CHAPTER 6

## 2

## Estimating Products

## Goal

**Solve two-step problems and use estimation to check the reasonableness of a calculation.**

1. Estimate which calculations are reasonable. Explain how you estimated.

a)  $224 \times 8 = 1792$

Reasonable because  $220 \times 10 = 2200$ , which is  
close to 1792.

b)  $29 \times 58 = 1200$

Not reasonable because  $30 \times 60 = 1800$ , which is  
greater than 1200.

c)  $1475 \times 99 = 213\ 425$

Not reasonable because  $1500 \times 100 = 150\ 000$ , which is less than 213 425.

d)  $49 \times 49 = 2401$

Reasonable because  $50 \times 50 = 2500$ , which is close to 2401.

2. Trevor has 60 nickels and 50 dimes. He wants to know if he can buy a CD that costs \$11.55. How much more money does he need to buy the CD? Explain how you solved the problem.

\$3.55. I multiplied  $60 \times 5$  and  $50 \times 10$ . I added the products together to get 800¢ or \$8.00.

Then I subtracted \$8.00 from \$11.55.

3. A group of 25 hockey players are having a contest to see who can sell the most chocolate bars. Each group of 5 players gets a box of 30 chocolate bars.

- a) Calculate the greatest number of chocolate bars that can be sold.

Show your work.

$$25 \div 5 = 5 \text{ groups}$$

$$5 \times 30 = 150 \text{ bars}$$

- b) Use estimation to show that your calculation in Part a) is reasonable.

Explain your thinking.

Round 25 to 30.

$$30 \div 5 = 6 \text{ groups}$$

My answer in Part a) is reasonable because  $6 \times 30 = 180$  bars, which is close to 150 bars.

## At-Home Help

To check the reasonableness of a multiplication, estimate the answer by rounding the numbers being multiplied to the nearest 10.

For example:

To check if  $12 \times 39 = 468$  is reasonable, round 12 and 39 to the nearest ten. Then multiply.  
 $10 \times 40 = 400$

So the product 468 is reasonable.

CHAPTER 6

3

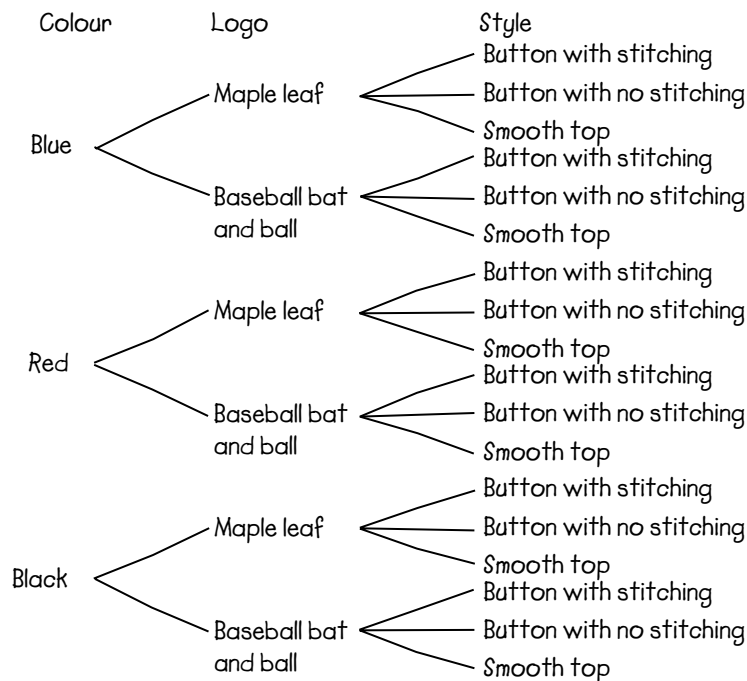
# Solve Problems Using Tree Diagrams

**Goal** Use a tree diagram to solve combination problems.

Norman is designing hats for his baseball team. The designs include 3 colours, 2 logos, and 3 styles.

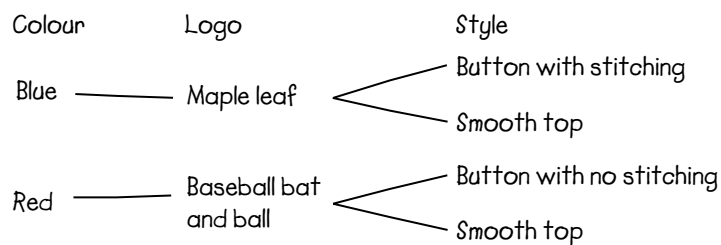
Colour	Logo	Style
Blue	Maple leaf	Button with stitching
Red	Baseball bat and ball	Button with no stitching
Black		Smooth top

1. How many different baseball hats can Norman design? Use a tree diagram. 18 hats



2. Create a tree diagram using 2 colours and 2 logos to get a total of 4 different hats.

Suggested answer:

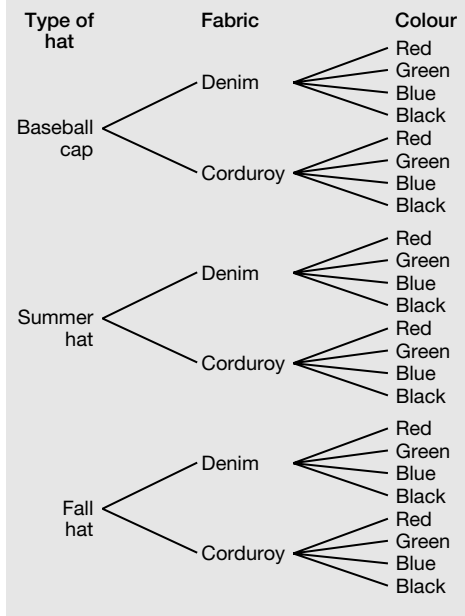


## At-Home Help

To find the number of combinations of items in a problem, use a tree diagram to list all possibilities.

Choose one item and list all the combinations for it. Repeat this process for all items.

For example, if you have 3 types of hats, 2 fabrics, and 4 colours, then the total number of different hats you can make is 24.



## CHAPTER 6

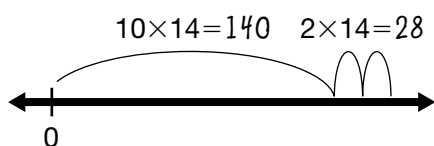
## 4

## Multiplying by Regrouping

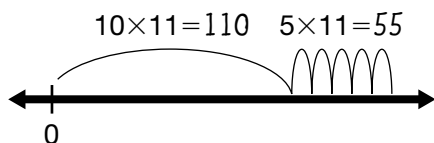
**Goal** Use mental math to multiply two two-digit numbers.

1. Use each number line to calculate.

a)  $12 \times 14 = \underline{\hspace{2cm}} \quad 168$



b)  $15 \times 11 = \underline{\hspace{2cm}} \quad 165$



2. Use mental math to calculate.

a)  $12 \times 16 = \underline{\hspace{2cm}} \quad 192$

b)  $17 \times 11 = \underline{\hspace{2cm}} \quad 187$

3. Calculate.

a)  $11 \times 12 = \underline{\hspace{2cm}} \quad 132$

b)  $12 \times 18 = \underline{\hspace{2cm}} \quad 216$

c)  $15 \times 13 = \underline{\hspace{2cm}} \quad 195$

4. A roller coaster holds 15 people. How many people can go on the roller coaster in 22 rides?

330 people

5. How many cobs of corn are in 19 dozen?

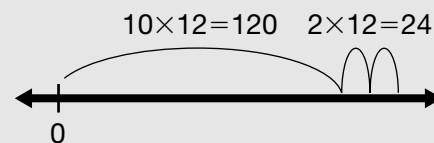
228 cobs

## At-Home Help

**Regrouping** is a mental math strategy for multiplying numbers. Regroup numbers into 10s to make calculations easier.

For example:

$12 \times 12$  can be regrouped as  $(10 + 2) \times 12$ .  $10 \times 12 = 120$  and  $2 \times 12 = 24$ .



$$\begin{aligned} 12 \times 12 &= 120 + 24 \\ &= 144 \end{aligned}$$

## CHAPTER 6

## 5

## Multiplying with Arrays

**Goal** Multiply two-digit numbers.

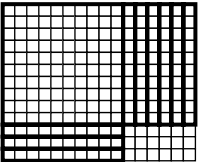
1. Calculate the number of cells in each table.

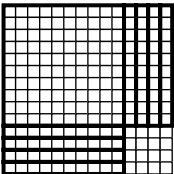
a) 11 rows and 13 columns 143 cells

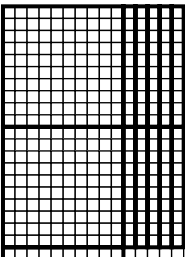
b) 17 rows and 21 columns 357 cells

c) 13 rows and 15 columns 195 cells

2. What multiplication question is represented by these base ten blocks? Calculate the product.

a)   $13 \times 16 = 208$

b)   $14 \times 14 = 196$

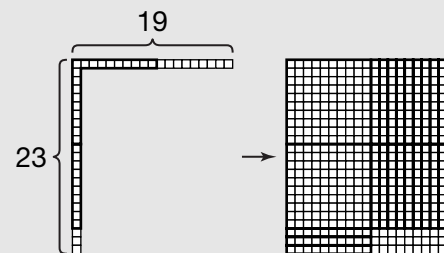
c)   $21 \times 15 = 315$

## At-Home Help

Arrays of base ten blocks can help when multiplying two numbers.

Represent one number vertically. Represent the second number horizontally. Place enough blocks to complete the rectangle.

For example,  $19 \times 23$  would look like



To multiply, find the product of each section. Then add to find the answer.

$$20 \times 10 = 200, 3 \times 10 = 30,$$

$$20 \times 9 = 180, \text{ and } 3 \times 9 = 27$$

$$19 \times 23 = 200 + 30 + 180 + 27$$

$$= 437$$

or

$$\begin{array}{r} 19 \\ \times 23 \\ \hline 57 \\ 380 \\ \hline 437 \end{array}$$

3. A checker board has 11 rows and 17 columns of squares. How many squares are on the board? 187 squares

4. Two quilts are made of square patches each measuring 1 dm by 1 dm. What is the area of each quilt?

a) 14 rows and 18 columns 252 square decimetres

b) 22 rows and 25 columns 550 square decimetres

## CHAPTER 6

## 6

# Dividing Hundreds by One-Digit Numbers

**Goal** Use division facts to divide hundreds.

1. What division facts can you use to calculate these answers? Find the answers.

	Division fact	Answer
a) $800 \div 2$	$8 \div 2 = 4$	<u>400</u>
b) $1500 \div 5$	$15 \div 5 = 3$	<u>300</u>
c) $1200 \div 3$	$12 \div 3 = 4$	<u>400</u>
d) $2800 \div 7$	$28 \div 7 = 4$	<u>400</u>
e) $3600 \div 4$	$36 \div 4 = 9$	<u>900</u>
f) $4200 \div 6$	$42 \div 6 = 7$	<u>700</u>

2. Explain how using  $16 \div 4$  can help you divide 1600 by 4.

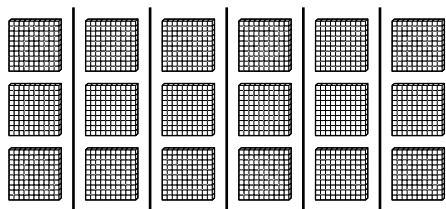
$$16 \div 4 = 4 \text{ so } 1600 \div 4 = 400.$$

3. Explain how multiplication can help you check your answer to Question 2.

$$400 \times 4 = 1600, \text{ which is the number to be divided in Question 2.}$$

4. An 1800 m track is divided equally into 6 shorter runs. Use a division fact to predict the length of each short run. Use base ten blocks to check your prediction.

300 m. Division fact is  $18 \div 6 = 3$ .

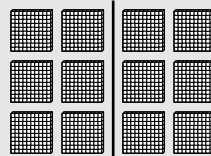


## At-Home Help

To divide hundreds by one digit, it is easier to use division facts for the non-zero digits.

For example, to divide  $1200 \div 2$  use the division fact  $12 \div 2 = 6$ .

An array can help with division.



$$1200 \div 2 = 600$$

You can also check your answer using multiplication.

$$600 \times 2 = 1200$$

# Estimating Quotients

**Goal** Overestimate and underestimate when dividing.

1. Overestimate each division. Show the numbers you used to estimate.

	Overestimate
a) $1427 \div 5$	$1500 \div 5 = 300$
b) $8 \overline{)2394}$	$2400 \div 8 = 300$
c) $3 \overline{)1713}$	$1800 \div 3 = 600$
d) $5406 \div 7$	$5600 \div 7 = 800$

2. Underestimate each division. Show the numbers you used to estimate.

	Underestimate
a) $1135 \div 2$	$1000 \div 2 = 500$
b) $1303 \div 4$	$1200 \div 4 = 300$
c) $2645 \div 3$	$2400 \div 3 = 800$
d) $4495 \div 6$	$4200 \div 6 = 700$

3. For each question, is it more accurate to overestimate or underestimate? Explain.

- a)  $2914 \div 5$  Overestimate because 2914 is closer to 3000 than 2500.
- b)  $3759 \div 6$  Underestimate because 3759 is closer to 3600 than 4200.

4. Estimate to solve each problem. Explain your thinking.

- a) The total attendance at 2 hockey games in March was 9498 people. Approximately what was the average attendance at each game?  
 $10\ 000 \div 2 = 5000$  people. I overestimated because 9498 is closer to 10 000 than 8000.
- b) Four CDs cost \$52.39. Three DVDs cost \$48.45. Which item costs more?  
one DVD. (CD)  $\$52 \div 4 = \$13$ , (DVD)  $\$48 \div 3 = \$16$ . I underestimated in both cases because  $\$52.39$  is closer to \$52 than \$53, and  $\$48.45$  is closer to \$48 than \$49.

## At-Home Help

A **quotient** is the answer to a division question.

For example, 8 is the quotient of  $48 \div 6$ .

$$48 \div 6 = 8$$

To do some calculations, it is easier to overestimate and underestimate. The actual answer will be somewhere between both estimates.

With other calculations, either an overestimate or an underestimate gives a fairly accurate answer.

For example,  $4753 \div 6$  would be  $4800 \div 6 = 800$  as an overestimate. 800 is fairly accurate because 4753 is closer to 4800 than 4200.

$1095 \div 2$  would be  $1000 \div 2 = 500$  as an underestimate. 500 is fairly accurate because 1095 is closer to 1000 than 1200.

$4539 \div 6$  would be  $4200 \div 6 = 700$  as an underestimate and  $4800 \div 6 = 800$  as an overestimate. The actual answer is about 750, or halfway between 700 and 800.

## CHAPTER 6

## 8

## Dividing Greater Numbers

**Goal** Divide a four-digit number by a one-digit number.

1. Estimate and then divide. Show your work.

	Estimate	Answer
a) $2641 \div 2$	$2600 \div 2 = 1300$	$1320 \text{ R}1$
b) $3 \overline{)2001}$	$2100 \div 3 = 700$	$667$
c) $6 \overline{)3517}$	$3600 \div 6 = 600$	$586 \text{ R}1$
d) $2134 \div 9$	$1800 \div 9 = 200$	$237 \text{ R}1$
e) $6 \overline{)1604}$	$1800 \div 6 = 300$	$267 \text{ R}2$
f) $4395 \div 5$	$4500 \div 5 = 900$	$879$

2. Check two of the answers in Question 1 using multiplication and addition.

Suggested answer:

Part a):  $1320 \times 2 = 2640$ ,  $2640 + 1 = 2641$

Part e):  $267 \times 6 = 1602$ ,  $1602 + 2 = 1604$

3. Eight dolphins in a pod each have about the same mass. Their total mass is about 1195 kg. What is the approximate mass of each dolphin?

about 149 kg





4. Four trucks are ready to transport the 8 dolphins to a marine centre. Each truck can carry 225 kg. Can the trucks carry all the dolphins in one trip? Explain.




No, all 4 trucks together can only carry 900 kg in one trip and the mass of the dolphins is greater than 900 kg.




## At-Home Help

To divide some numbers, you may need to regroup first.

For example, to divide  $1855 \div 4$ , use base ten blocks.

Thousands	Hundreds	Tens	Ones
			

Thousands	Hundreds	Tens	Ones
			

Thousands	Hundreds	Tens	Ones
			

$$1855 \div 4 = 463 \text{ R}3$$



## CHAPTER 6

## 9

# Choosing Multiplication and Division Methods

**Goal** Choose and justify a calculation method.

Answer each question using the information given.  
Explain why you chose multiplication or division.

**Did you know...**

- the giant Canada goose has a mass of 7 kg
- it flies at a maximum altitude of 245 m from the ground
- it takes 30 days to hatch one nest of eggs
- it can fly about 40 km in 1 hour
- it can fly for about 16 hours each day

1. What would be the mass of a flock of 65 geese?

455 kg. Use multiplication because the mass of one  
goose is given and you want to know the total mass  
of 65 geese.

2. How many hours would the geese have flown in 12 days?

192 h. Use multiplication because the number of hours one goose flies per day is given  
and you want to know the total number of hours flown in 12 days.

3. How many days would the geese fly if they flew for a total of 592 hours?

37 days. Use division because the total hours over several days is given and you want  
to know the number of days.

4. How many days would a goose sit on 15 nests of eggs?

450 days. Use multiplication because the number of days a goose sits per nest is given  
and you want to know the total number of days needed for 15 nests.

5. Geese fly at 3 different altitudes from the ground. All three altitudes are equal in distance to each other. Approximately what are the 3 different altitudes from the ground?

about 82 m, 163 m, and 245 m. Use division because the total altitude above ground is given  
and you want to know the individual altitudes.

**At-Home Help**

To decide whether to multiply or divide in a problem, look to see if any totals are given.

For example, if the total cost of several items having the same value is given and the problem asks you to find the cost of each item, you need to divide.

If you are asked to find a total, you need to multiply.

For example, if you are given the volume of juice per bottle and the number of bottles, you can find the total volume by multiplying.

## CHAPTER 6

## Test Yourself

Circle the correct answer.

1. What is the product of  $50 \times 40$ ?

A. 900

B. 200

**C. 2000**

D. 9000

2. What is the product of  $90 \times 30$ ?

A. 1200

**B. 2700**

C. 120

D. 270

3. What is the product of  $600 \times 60$ ?

A. 1200

B. 3600

C. 12 000

**D. 36 000**

4. Which estimate is most reasonable for  $26 \times 18$ ?

A. 550

**B. 450**

C. 750

D. 600

5. Which estimate is most reasonable for  $38 \times 35$ ?

A. 900

B. 1050

C. 1100

**D. 1200**

6. What is the product of  $8 \times 257$ ?

**A. 2056**

B. 1656

C. 2165

D. 2065

7. What is the product of  $94 \times 62$ ?

A. 5688

B. 5628

**C. 5828**

D. 5288

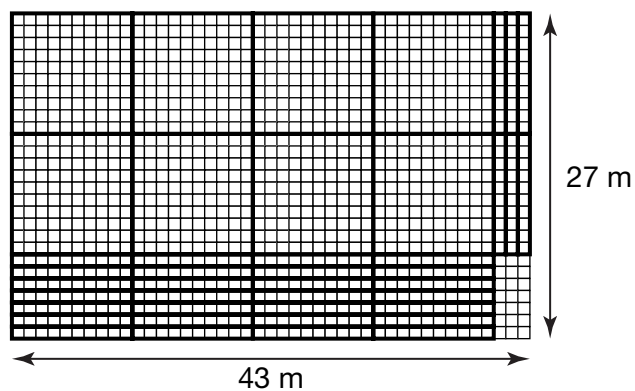
8. What is the area of this rectangle?

A. 1611 square metres

**B. 1161 square metres**

C. 1616 square metres

D. 1116 square metres



## CHAPTER 6

## Test Yourself Page 2

9. What is the answer to  $7396 \div 4$ ?

A. 1489

**B. 1849**

C. 1949

D. 1889

10. What is the answer to  $4508 \div 8$ ?

A. 563 R1

B. 562 R3

C. 562 R4

**D. 563 R4**

11. What are the missing numbers from top to bottom?

$$\begin{array}{r} 57 \\ \times 4? \\ \hline 3?2 \\ 2??? \\ \hline ????? \end{array}$$

A. 4, 6, 280, 2822

**B. 6, 4, 280, 2622**

C. 6, 4, 260, 2822

D. 4, 6, 260, 2622

12. Tiles are to be placed on a kitchen wall. They are in 18 rows and 14 columns. How many tiles are needed?

A. 254 tiles

B. 245 tiles

**C. 252 tiles**

D. 225 tiles

13. The area of a rectangular room is 63 square metres. The longest side is 9 m long. What is the perimeter of the room?

**A. 32 m**

B. 30 m

C. 31 m

D. 33 m

14. A square room has a perimeter of 164 m. What is its area?

A. 1861 square metres

B. 1600 square metres

C. 328 square metres

**D. 1681 square metres**