

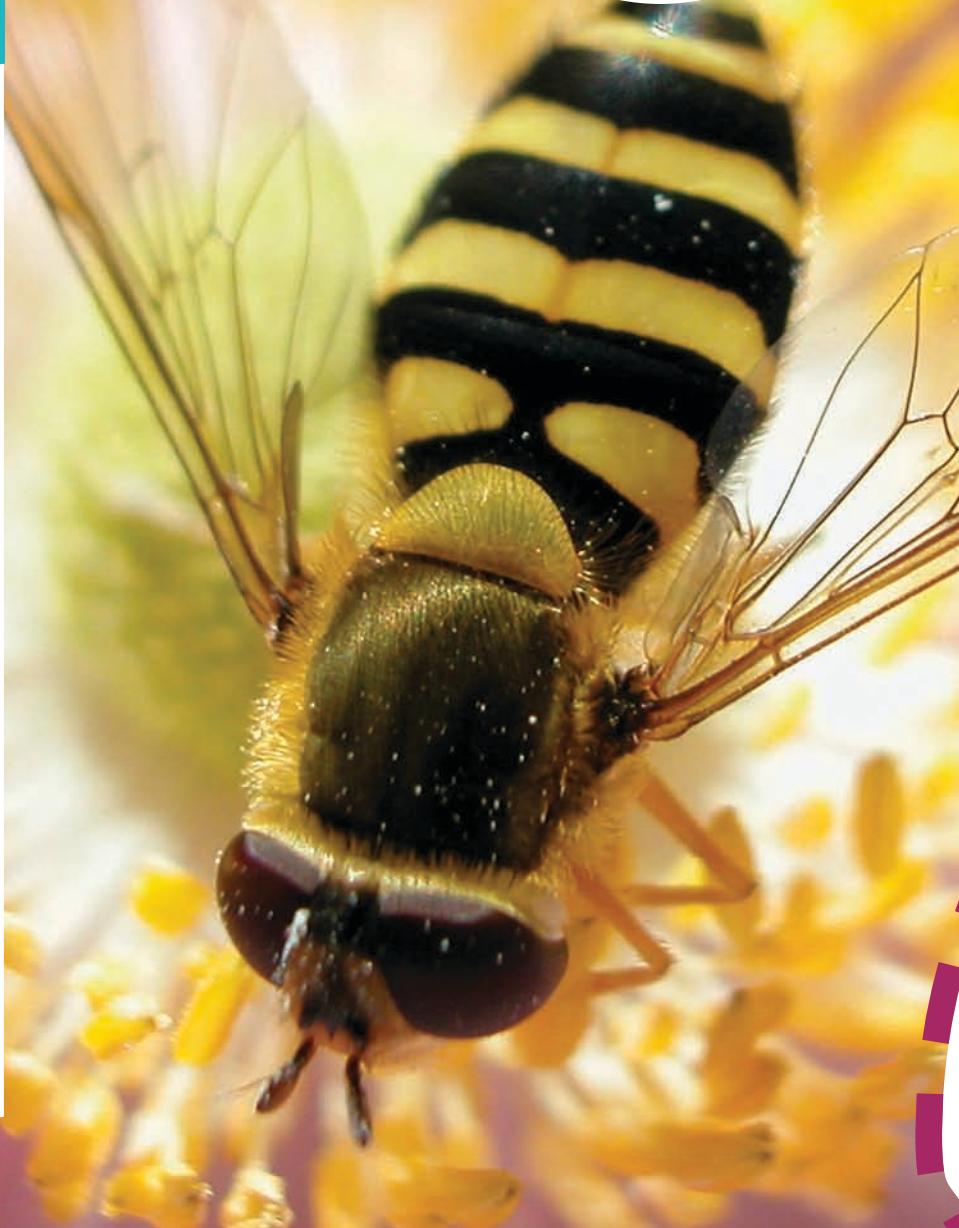
Whole Numbers

2

At the Apiary

Learning Goals

- read and write whole numbers in standard, expanded, and written forms
- use place value to represent and read whole numbers
- compare and order whole numbers
- identify and describe multiples and factors to 100
- identify and describe composite and prime numbers to 100
- use order of operations
- estimate sums, differences, products, and quotients
- use mental math to add, subtract, multiply, and divide
- add four 3-digit numbers and subtract from a 5-digit number
- multiply and divide by a 2-digit number
- pose and solve multistep problems



Key Words

million

period

billion

trillion

common multiples

prime number

prime factor

composite number

expressions

Honeybees have been producing honey for more than 150 million years. Honeybees gather nectar from flowers. They convert the nectar to honey and store it as food in the beehive. A colony of honeybees produces more honey than it needs. For 6000 years, beekeepers have harvested honey for people to eat.

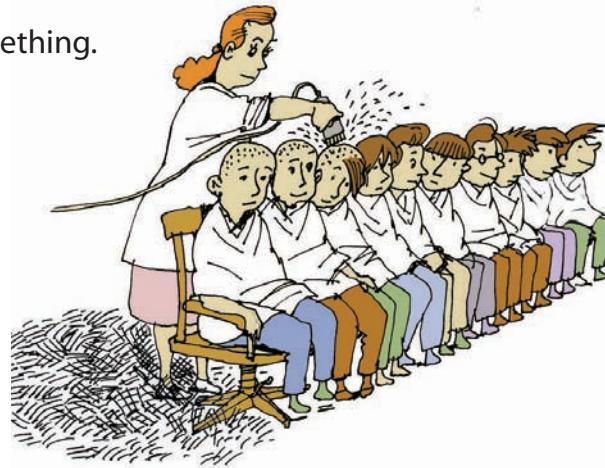


- Lesley Haynes has 20 hives.
Each hive has about 75 000 honeybees.
How could you find out how many honeybees Lesley has?
- A honeybee travels about 195 km in about 50 round trips to collect enough nectar to make 1 g of honey.
About what distance does a honeybee travel in one round trip?
How do you know?
- What else do you know about Lesley's honeybees?

Exploring One Million

Think about collecting 1 million of something.

Brown-haired people have about
100 000 hairs on their heads.
So, to collect 1 million hairs,
you would need the hair from
about 10 brown-haired people.



Explore



Here are some questions about 1 million.

How long do you think it would take to make a calculator count by ones to 1 million?



How many dictionary pages would it take to list 1 million words and their definitions?

How long would a line of 1 million children standing side by side be?

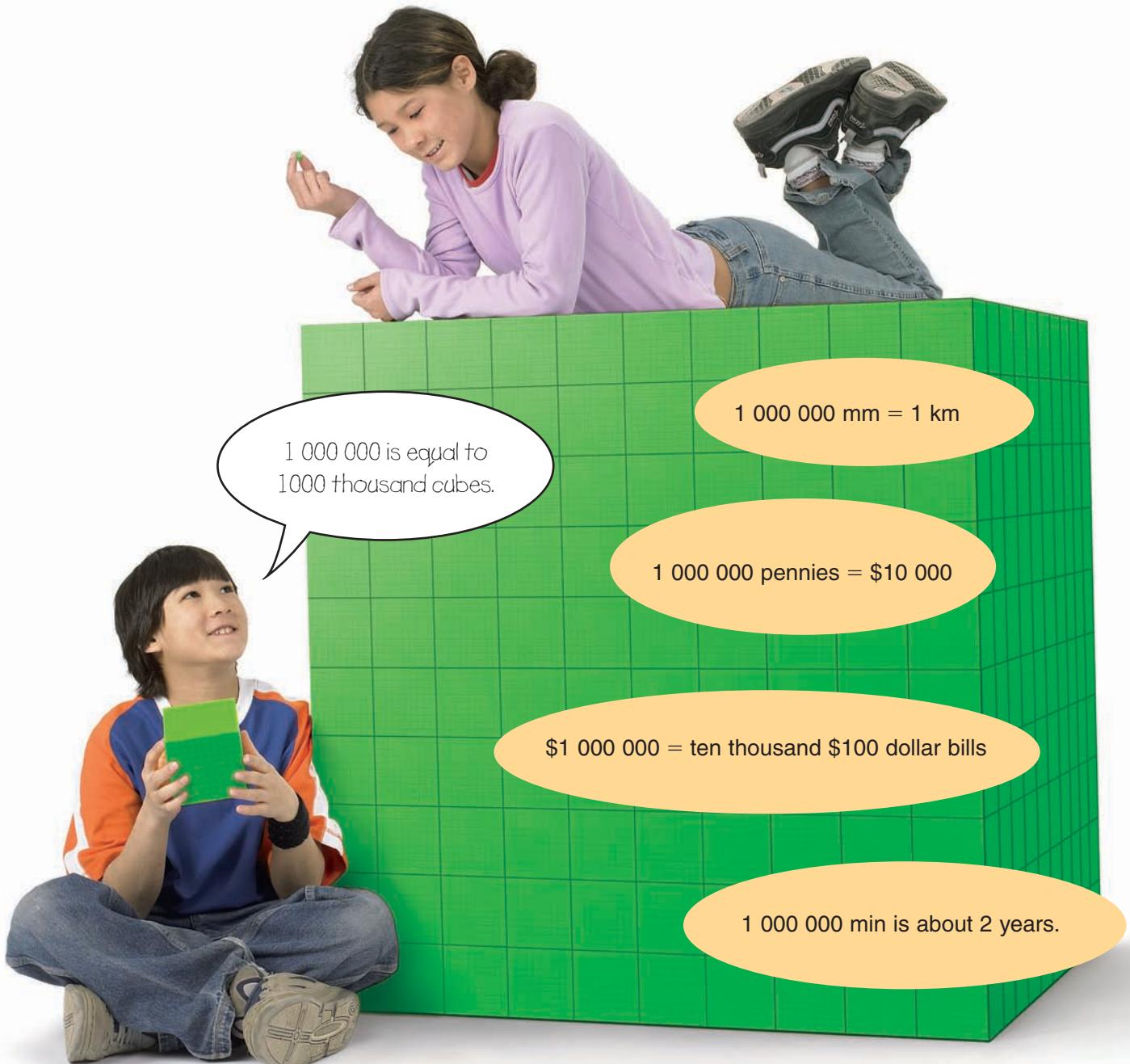
- Choose one of these questions to explore, or think of a question of your own.
- Gather any materials you will need.
- Estimate an answer to your question. Then develop and carry out a strategy to find the answer.

Show and Share

Share your question, estimate, and answer with another pair of students.
Describe the strategy you used to find your answer.
Is your answer exact or is it approximate? Explain.

Connect

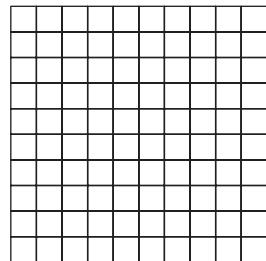
One **million** is 1000 thousands. It is a very large number!
Here are some benchmarks to help you think about 1 million.





Practice

1. a) How many small squares are there on this grid?
b) How many small squares would be on 10 grids?
On 100 grids?
What strategy did you use to find your answers?
c) Suppose you need 1 million small squares.
Estimate the number of these grids you need.
Find the number of grids needed to make 1 million.



2. How long would a line of 1 million centimetre cubes be?
Give your answer in as many different standard units
of measure as you can. Show your work.
3. a) Suppose you use a calculator to count by 100 000s to 1 000 000.
How many times will you press $=$? Use a calculator to check.
b) How many times would you have to press $=$
to count by 10 000s to 1 000 000? Use a calculator to check.

4. How many days will it take you to spend \$1 000 000,
if each day you spend each amount?
a) \$100 000 b) \$10 000 c) \$1000
d) \$100 e) \$10
Show your work.



5. Estimate the length of 1 million straws arranged end to end.
Find the answer. Show your work.
Was your estimate high or low? Explain.
6. Write your own problem about 1 million.
Trade problems with a classmate.
Solve your classmate's problem.
7. Suppose your heart beats 70 times a minute.
How long would it take to beat 1 million times?

Reflect

Explain how you could figure out about
how many days there are in 1 million seconds.

Numbers Every Day

Mental Math

Write an equivalent decimal for each number.

- 0.5
- 2.90
- 31.70
- 694.3

2

Understanding Large Numbers

The world's all-time best selling copyright book is *Guinness World Records*. From October 1955 to June 2002, 94 767 083 copies were sold.

You can extend the place-value chart to represent 94 767 083.



Hundred Millions	Ten Millions	Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
	9	4	7	6	7	0	8	3

Explore

Here are some of the world records reported in the *Guinness World Records 2004*.

- The largest bag of cookies was made in London, Ontario. It contained 100 152 chocolate chip cookies.
 - The greatest attendance at an Olympic Games was 5 797 923. The games took place in Los Angeles in 1984.
 - The most dominoes toppled by a group was 3 847 295, out of a possible 4 000 000. This took place at Domino Day "Expressions for Millions" in Leeuwarden, Netherlands.
 - The most common name in the world is Li. China alone has 87 000 000 people with this name.
- Take turns reading the records aloud.
- Each of you chooses 2 numbers from the records. Represent each number in as many ways as you can.



Show and Share

Share your work with another pair of students.

Talk about the different ways you represented your numbers.

Connect

- These facts may help you read and write large whole numbers.

- From right to left, each group of 3 place values is called a **period**.
- Within each period, the digits of a number are read as hundreds, tens, and ones.

This place-value chart shows the number of items in the world's largest collection of matchbook covers, 3 159 119.

Millions Period			Thousands Period			Units Period		
Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones
		3	1	5	9	1	1	9

3 000 000 100 000 50 000 9000 100 10 9

We read this number as:

three *million* one hundred fifty-nine *thousand* one hundred nineteen

When we read large numbers, we say the period name after each period except the units period.

We can write this number in:

- standard form: 3 159 119
- expanded form: $3\,000\,000 + 100\,000 + 50\,000 + 9000 + 100 + 10 + 9$
- number-word form: three million one hundred fifty-nine thousand one hundred nineteen

We leave a space between the periods when we write a number with 5 or more digits.

One thousand million is one **billion**.
One thousand billion is one **trillion**.

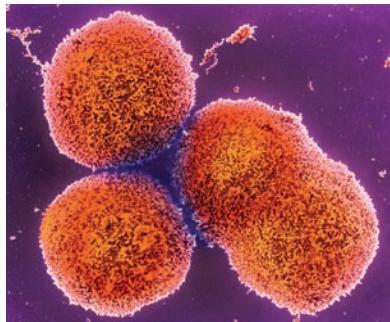
- The place-value chart can be extended to the left to show greater whole numbers.

This place-value chart shows the approximate number of cells in the human body.

Trillions			Billions			Millions			Thousands			Units		
H	T	O	H	T	O	H	T	O	H	T	O	H	T	O
	5	0	0	0	0	1	0	0	0	0	0	0	0	0

We write: 50 000 100 000 000

We say: fifty trillion one hundred million



Practice

- Write each number in standard form.
 - 6 million 276 thousand 89
 - $20\,000\,000 + 4\,000\,000 + 300\,000 + 40\,000 + 2000 + 500 + 80 + 4$
 - two billion four hundred sixty million sixty-nine thousand eighteen
 - How does a million compare to a thousand? To ten thousand?
Use a calculator to check your answer.
 - Write each number in expanded form.
 - 75 308 403
 - 64 308 470 204
 - 99 300 327
 - Write the value of each underlined digit.
 - 627 384
 - 54 286 473
 - 41 962 014
 - 25 041 304 000
 - Write the number that is:
 - 10 000 more than 881 462
 - 100 000 less than 2 183 486
 - 1 000 000 more than 746 000
 - 1 000 000 less than 624 327 207
- Tell how you know.

Numbers Every Day

Number Strategies

Round each number to the nearest hundred, the nearest thousand, and the nearest ten thousand.

- 475 498
- 3 045 349
- 40 469
- 16 944 500

6. China is the most populated country in the world.
In 2001, it had an estimated population of one billion
two hundred seventy-four million nine hundred fifteen thousand.
Write this number in standard form and in expanded form.
7. The largest known prehistoric insect is a species of dragonfly.
It lived about 280 000 000 years ago.
Write this number in words.



8. The world's largest shopping centre is in Edmonton, Alberta.
It covers an area of $492\ 386\ m^2$ and cost
about \$1 200 000 000 to build.
Write these numbers in a place-value chart.
9. A student read 3 000 146 as "three thousand one hundred forty-six."
How would you explain the student's error?

10. I am a number between 7 000 000 and 8 000 000.
All my digits are odd.
All the digits in my thousands period are the same.
All the digits in my units period are the same.
The sum of my digits is 31.
What number am I?
Give as many answers as you can.
What strategies did you use to find the
mystery number?



Reflect

Explain how you know the value of each digit in the number 5 487 302.

At Home

Look through newspapers and magazines.
Find large numbers.
How are the numbers written?



3

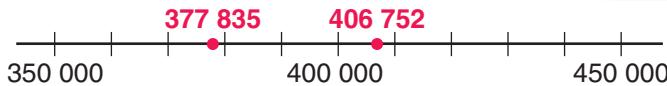
Comparing and Ordering Numbers

The area of Paraguay is $406\ 752 \text{ km}^2$.

The area of Japan is $377\ 835 \text{ km}^2$.

You can show these numbers on a number line.

Which country has the greater area? How do you know?



Explore

Use this table that shows the areas of 10 countries. Draw a place-value chart you can use to record each number.

- Partner A finds the greatest number in the table and reads it aloud. Partner B records the number in a place-value chart.
- Partner B finds the next greatest number and reads it aloud. Partner A records the number in the place-value chart.
- Continue until the numbers are in order from greatest to least. Order the countries from greatest area to least area.

Country	Area (km^2)
Argentina	2 766 890
Australia	7 686 850
Brazil	8 511 970
Canada	9 984 670
China	9 596 960
Egypt	1 001 450
Greenland	2 175 600
India	3 287 590
Russian Federation	17 075 200
United States	9 629 090

Show and Share

Share your results with another pair of students.

How did you know how many columns to put in your place-value chart?

How did you label the columns?

What strategies did you use to choose the numbers?

Where would Paraguay's area fit in the ordered list?

Where would Japan's area fit?

Connect

Here is a table showing the areas of 3 more countries.

Country	Area (km^2)
Colombia	1 138 910
South Africa	1 219 912
Thailand	514 000

You can use a place-value chart to order the areas from greatest to least.



Country	Millions			Thousands			Units		
	Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones
Colombia			1	1	3	8	9	1	0
South Africa			1	2	1	9	9	1	2
Thailand				5	1	4	0	0	0

Both 1 219 912 and 1 138 910 have 1 million.
1 219 912 has 219 thousands.
1 138 910 has 138 thousands.
So, 1 219 912 is the greatest number.

514 000 has no millions.
It is the least number.

So, $1\ 219\ 912 > 1\ 138\ 910 > 514\ 000$

The areas from greatest to least are:

$1\ 219\ 912 \text{ km}^2, 1\ 138\ 910 \text{ km}^2, 514\ 000 \text{ km}^2$

The order of the countries from greatest to least area is:

South Africa, Colombia, Thailand

Math Link

Social Studies

Japan is one of Canada's trading partners. In 2001, the value of Japan's exports was US\$403 496 million. That year, Canada's exports were worth US\$259 858 million.



Practice

1. Copy and complete. Replace each \square with $>$ or $<$.

a) $11\ 208\ 464 \square 9\ 289\ 500$ b) $83\ 617 \square 1\ 327\ 090$
c) $50\ 985\ 362 \square 27\ 041$ d) $2\ 004\ 023 \square 385\ 008$

2. Order these numbers from least to greatest.

595 032 461 99 426 322 3 217 530
84 620 1 300 124 685 428

3. The table shows estimates of the populations of some cities in 2015.

City	Expected Population in 2015
Dhaka (Bangladesh)	22 766 000
Mumbai (India)	22 577 000
Tokyo (Japan)	27 190 000



- a) Why do you think the expected population numbers are rounded?
b) Which of these cities is expected to have the greatest population in 2015? The least? How do you know?

4. Use the digits 1, 2, 4, 6, 7, 8, and 9 once in each number.

Write five 7-digit numbers between 8 000 000 and 9 000 000.

Order the numbers from least to greatest.

What strategies did you use to form the numbers?

Could you write more than 5 numbers? Explain.



5. This table shows the approximate areas of the oceans of the world.

Ocean	Area (km ²)
Arctic	9 485 000
Atlantic	86 557 000
Indian	73 427 000
Pacific	166 241 000

Order the oceans from greatest to least area.



6. Clayton and Olivia played a computer game.

Olivia's final score was 2 306 421 and Clayton's was 2 302 972.

Show these numbers on a number line.

Whose score was greater? How do you know?

7. The table shows the approximate populations of some Canadian provinces in 2002.

- a) Which of these provinces had the least population? The greatest population?
- b) Which of these provinces had a population greater than 1 million? Less than 1 million?
- c) Which province had a population of about 4 million? About half a million?
- d) Saskatchewan's population in 2002 was 1 011 800.

Which province's population was about 3 times that of Saskatchewan?

Province	Population
Alberta	3 113 600
British Columbia	4 141 300
Manitoba	1 150 000
New Brunswick	756 700
Newfoundland and Labrador	531 600
Nova Scotia	944 800
Ontario	12 068 300

8. How many different ways can you replace □ with a digit so each statement is true?

Show your work.

- a) $3\ 267\ 001 < 3\ \square\ 34\ 379$
- b) $6\ 481\ 736 > 6\ \square\ 82\ 159$

Reflect

Manitoba's population was 1 123 900 in 1994, and 1 119 583 in 2001.

Did the population increase or decrease between these years? How do you know?

Numbers Every Day

Number Strategies

Order these decimals from least to greatest.

9.46, 4.96, 6.49,
6.94, 9.64, 4.69

Exploring Multiples

Explore



On Thursday morning, the local radio station held a call-in contest.

- Every third caller to the station won a T-shirt.
- Every seventh caller won a baseball cap.

In 50 calls, which callers won a T-shirt? A baseball cap?

Both prizes?

Use any materials you like to solve this problem.

Show how you used materials to solve this problem.

Sorry, you are
caller number 10.



Show and Share

Share your answers with another pair of students.

What strategies did you use to solve the problem?

Discuss how using materials helped.

Describe any patterns you noticed.

Connect

Recall that to find the multiples of a number,
start at that number and count on by the number.

You can use a hundred chart to find the multiples of a number.

The multiples of 4 are:

4, 8, 12, 16, 20, 24, 28, 32, 36, 40, ...

The multiples of 6 are:

6, 12, 18, 24, 30, 36, ...

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40

12, 24, and 36 appear in both lists.

They are multiples of 4 and of 6.

They are **common multiples** of 4 and 6.

Each common multiple of 4 and 6 is divisible by 4 and by 6.

Practice

You may use a hundred chart to model your solutions.

1. List the first 10 multiples of each number.
a) 2 b) 5 c) 8 d) 12 e) 11 f) 7
2. Find the first 3 common multiples of each pair of numbers.
a) 4 and 5 b) 10 and 15 c) 3 and 9
d) 2 and 11 e) 7 and 4 f) 6 and 10
3. Find the first 3 common multiples of each set of numbers.
a) 3, 4, and 6 b) 2, 3, and 4 c) 4, 5, and 10
Explain your work.
4. Find the first 2 common multiples of 36 and 48.

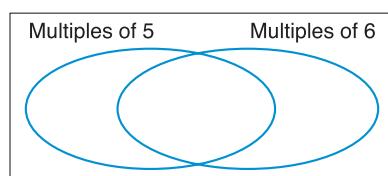


5. A spider has 8 legs. An ant has 6 legs.
There are a group of spiders and a group of ants.
The groups have equal numbers of legs.
What is the least number of spiders and ants
in each group? Show your work.



6. Find all the common multiples of 8 and 9 that are less than 100.

7. Make a large copy of this Venn diagram.
Sort these numbers.
45, 24, 52, 30, 66, 15, 85, 90, 72, 60, 20, 38



8. Sam jogs every 2 days. He does Pilates every 3 days.
Suppose Sam jogs and does Pilates on October 1.
What are the next 3 dates on which he will jog
and do Pilates? Explain how you know.



Reflect

Explain how you would find the first common multiple of 12 and 15.

Numbers Every Day

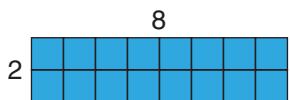
Calculator Skills

Find 2 numbers with
a sum of 46 and a product
of 408.



Prime and Composite Numbers

Numbers multiplied to form a product are factors of the product.



$$2 \times 8 = 16$$

factor factor product

2 and 8 are factors of 16.

What other factors of 16 can you name?

Explore

You will need Colour Tiles or congruent squares and grid paper.

- Find all the different rectangles you can make using each number of tiles from 2 to 20.
Record each rectangle on grid paper. Write a multiplication sentence that describes the number of tiles in each rectangle.
- For which numbers of tiles could you make only 1 rectangle?
For which numbers of tiles could you make more than 1 rectangle?



Show and Share

Share your work with another group of students.

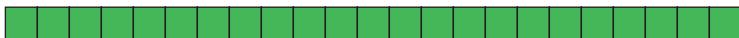
What are the factors of 2? Of 3?

What are the factors of 16? Of 20?

How could you find the factors of a number without making rectangles?

Connect

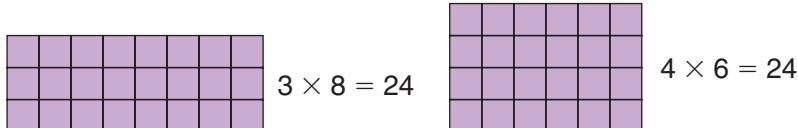
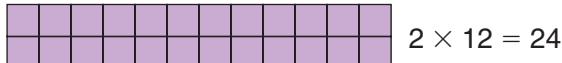
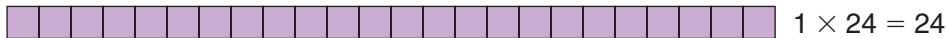
- Suppose you have 23 Colour Tiles.
You can make only 1 rectangle with all 23 tiles.



23 has 2 factors: 1 and 23.
A number with exactly 2 factors,
1 and itself, is a **prime number**.
23 is a prime number.

A prime number is a number greater than 1 that is divisible only by 1 and itself.

- Suppose you have 24 Colour Tiles.
You can make 4 different rectangles with 24 tiles.



A composite number can be written as a product of prime factors:
 $24 = 2 \times 2 \times 2 \times 3$

24 has 8 factors: 1, 2, 3, 4, 6, 8, 12, and 24.
The **prime factors** of 24 are 2 and 3.
A number with more than 2 factors is a **composite number**.

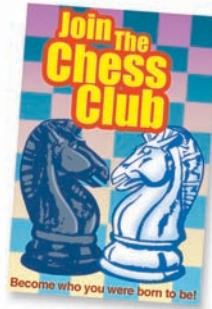
Practice

You may use Colour Tiles or counters to model your solutions.

1. List all the factors of each number. Which factors are prime factors?
a) 25 **b)** 30 **c)** 12 **d)** 50
e) 28 **f)** 100 **g)** 20 **h)** 63
2. Write 3 numbers between 30 and 50 that have:
a) exactly 2 factors each **b)** more than 2 factors each
3. Write 3 numbers less than 100 that have exactly 4 factors each.
4. Tell if each number is prime or composite. How do you know?
Write each composite number as a product of prime factors.
a) 59 **b)** 93 **c)** 97 **d)** 87 **e)** 73 **f)** 45



5. Between 20 and 28 students signed up for the chess club.
The students could not be divided exactly
into groups of 2, 3, 4, or 5.
How many students signed up for the chess club?
Show your work.

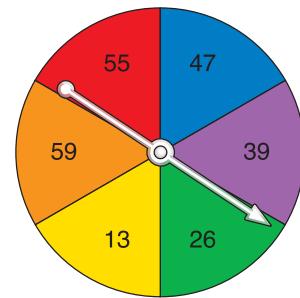


6. Three numbers between 70 and 80 are prime numbers.
What numbers are they?
Explain how you know they are prime numbers.

7. How many days in September
have a prime number date?
How many have a composite
number date?
Show how you know.



8. How can you tell that 32 and 95 are not
prime numbers without finding their factors?
9. Carmine and Nasra play a game with this spinner.
Carmine gets a point if the pointer lands on a prime number.
Nasra gets a point if the pointer lands on a composite number.
Is this a fair game? How do you know?
10. Alexis said, "All prime numbers except for
the number 2 are odd. So, all odd numbers
must be prime numbers."
Do you agree with Alexis? Explain.
11. Copy this table.



	Prime	Composite
Even		
Odd		

Sort the numbers from 2 to 30 in the table.

Reflect

Jamie thinks that 1 is neither prime nor composite.
Show why you agree or disagree with him.

Numbers Every Day

Number Strategies

Round each number to the nearest hundred thousand, and to the nearest million.

- 46 201 988
- 9 998 765
- 10 040 678
- 52 061 215

Strategies Toolkit

Explore



Jan has 10 clown fish and 15 snails.

She wants to place all of them in fish tanks so each tank has the same number of fish and snails. What is the greatest number of tanks Jan can set up?

You may use any materials to model your solution. Record your solutions.



Show and Share

Describe the strategy you used to solve the problem.

Connect

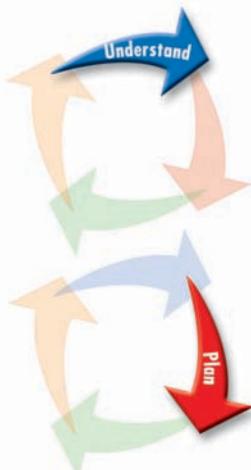
Strategies

Twenty-four girls and 18 boys are forming teams.

All the children are on a team.

Teams must have equal numbers of girls and equal numbers of boys.

What is the greatest number of teams that can be formed?



What do you know?

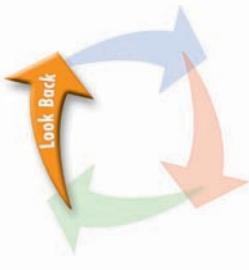
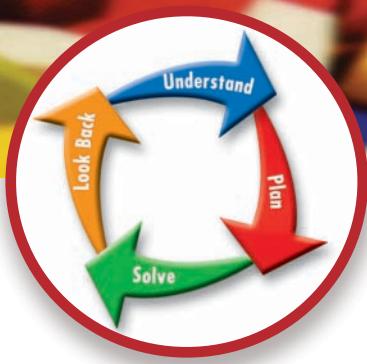
- There are 24 girls and 18 boys.
- Boys and girls should be divided equally among the teams.

Think of a strategy to help you solve the problem.

- You can **make an organized list**.
- How many girls and how many boys are on each of 2 teams? 3 teams?

Strategies

- Make a table.
- Use a model.
- Draw a diagram.
- Solve a simpler problem.
- Work backward.
- Guess and check.
- Make an organized list.
- Use a pattern.
- Draw a graph.
- Use logical reasoning.



Can you make 4 teams? 5 teams? 6 teams?

Explain.

What is the greatest possible number of teams?

How many girls and how many boys
will be on each team?

Check your work.

Did you find the greatest number of teams?

Does each team have the same number of girls
and the same number of boys?

How could you have used common factors
to solve this problem?

Practice

Choose one of the

Strategies

- Projecta has 36 photos of her favourite rock star.
She wants to arrange the photos in groups that have equal numbers of rows and columns.
How many different arrangements can Projecta make?
Show your work.
- Keshav is making prize bags for Play Day.
He has 40 pencils, 32 pens, and 16 notepads to use as prizes.
Keshav wants to make as many prize bags as possible.
He wants all the bags to be the same.
 - How many prize bags can Keshav make?
 - How many pencils, pens, and notepads will be in each bag?
How do you know?



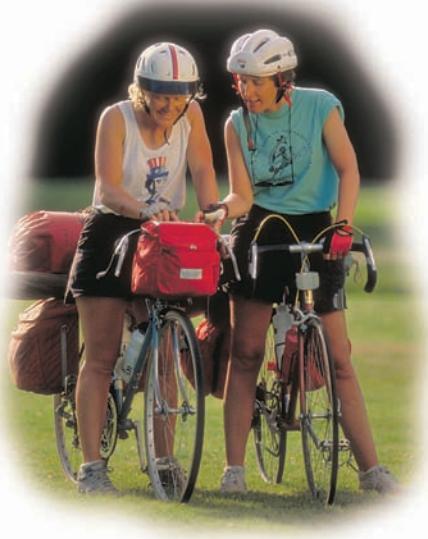
Reflect

Explain how an organized list can help you solve a problem.

Using Mental Math

Explore

On a bike trip, Marta and Sulyn rode 39 km a day for 7 days. How far did they travel in 7 days? Use mental math to find out. Record your answer.



Show and Share

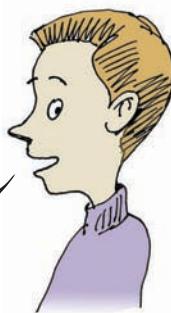
Share your solution with a classmate. Compare the mental math strategies you used.

Connect

- Use mental math to add: $60 + 35 + 40$
Rearrange and use compatible numbers.
Compatible numbers are pairs of numbers that are easy to compute.

$$\begin{aligned} 60 + 35 + 40 &= (60 + 40) + 35 \\ &= 100 + 35 \\ &= 135 \end{aligned}$$

Changing the order of the numbers being added or multiplied does not change the sum or product.



- Use mental math to subtract: $687 - 464$
When no regrouping is needed, start subtracting from the left.

$$687 - 464 = 223$$

Think:

$$\begin{aligned} 600 - 400 &= 200 \\ 80 - 60 &= 20 \\ 7 - 4 &= 3 \end{aligned}$$

- Use mental math to multiply: $4 \times 19 \times 25$

Rearrange and use compatible numbers.

$$\begin{aligned} 4 \times 19 \times 25 &= 19 \times (4 \times 25) \\ &= 19 \times 100 \\ &= 1900 \end{aligned}$$

25 and 4 are compatible numbers.
Their product, 100, is easy to multiply with any other factor.

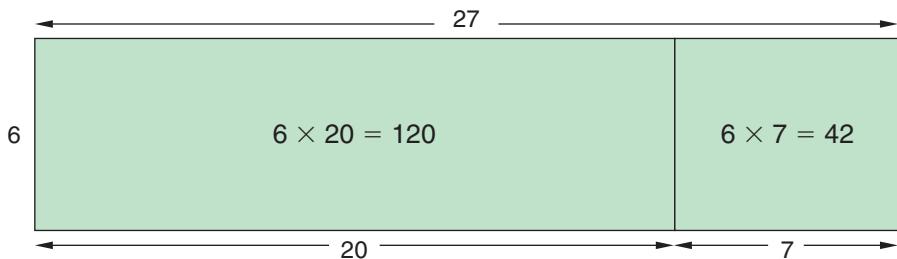
- Use mental math to multiply: 6×27

Break one of the numbers apart to make numbers that are simple to work with.

$$\begin{aligned} 6 \times 27 &= 6 \times (20 + 7) \\ &= (6 \times 20) + (6 \times 7) \\ &= 120 + 42 \\ &= 162 \end{aligned}$$

Twenty-seven breaks apart to $20 + 7$. It's easy to multiply 20 by 6 and 7 by 6.

Think of the area of a rectangle.



Practice

Use mental math.

1. Add. Use compatible numbers when you can.

a) $25 + 18 + 75$	b) $170 + 130 + 67$	c) $525 + 375 + 80$
d) $33 + 20 + 280$	e) $350 + 146 + 250$	f) $390 + 110 + 62$

2. Subtract. For which questions would you start from the left?

a) $527 - 416$	b) $3170 - 250$	c) $786 - 585$
d) $2468 - 2157$	e) $311 - 205$	f) $477 - 372$

3. Multiply. For which questions would you use compatible numbers?

a) $5 \times 36 \times 20$	b) $65 \times 50 \times 10$	c) 27×4
d) 7×59	e) 17×5	f) $250 \times 18 \times 4$

4. A stamp collector offered to sell 6 rare stamps for \$59 each.
 What was the collector's total asking price?
 Solve this problem 2 ways.
 Which method is easier? Why?
5. Harland has 140 red, 86 green, and 60 multicoloured marbles.
 How many marbles does Harland have in all?
6. Ben's answer to a subtraction problem was 396.
 He solved it using mental math by starting on the left.
 What might the problem have been?
 How many different problems can you write?
 Show your work.
7. Write a multiplication problem you can solve mentally
 by breaking one of the numbers apart.
 Solve your problem.



8. Manuela planted 5 patches of beans.
 Each patch had 8 rows of 27 bean plants.
 a) How many bean plants are in each patch?
 b) How many bean plants did Manuela plant in all?
 Explain your strategy.

9. Multiply.
- | | | |
|-------------------------|-------------------------|-------------------------|
| a) 9×79 | b) 9×80 | c) 9×81 |
| d) 8×68 | e) 8×70 | f) 8×72 |
| g) 7×57 | h) 7×60 | i) 7×63 |

What patterns do you see in the questions?
 Make up some multiplication questions that have
 a similar pattern. Find each product.

10. Make up a multiplication problem that
 you can solve using compatible numbers.
 Solve your problem.

Reflect

Suppose you were to multiply 86 by 30 mentally.
 Which number would you break apart? Explain.

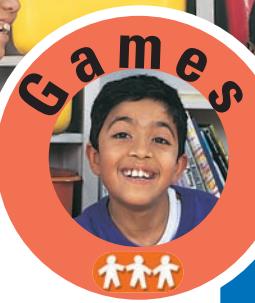
Numbers Every Day

Number Strategies

Will each product be greater
 than or less than 765×21 ?
 How do you know?

$$\begin{aligned} &800 \times 20 \\ &750 \times 20 \\ &770 \times 25 \end{aligned}$$

Buzz!



You will need a watch or a clock with a second hand.

The last player to remain in the game is the winner.

As a group, decide how many seconds to allow between the numbers as they are counted.

Decide who will be Player A, Player B, and Player C.

- Player B selects a target number from 2 to 9.
- Player C will monitor the pace and make sure Player A's response is correct.

A player is eliminated for:

- saying "buzz!" at the wrong time
- not saying "buzz!" at the right time

- Player B starts to count by 1s from 1 at the agreed speed.

Player A must say "buzz!" whenever a multiple of the target number is reached.

For example, if the target number is 5, play should go as follows:

1, 2, 3, 4, "buzz!", 6, 7, 8, 9, "buzz!", ...

Player B stops counting at 120 if Player A has been correct to that point.

- Change roles and play again. An eliminated player becomes Player C. The new Player B selects the target number for the new Player A.
- Play until only one player remains in the game.



Order of Operations

You have added, subtracted, multiplied, or divided with whole numbers.

Add, subtract, multiply, and divide are operations.

In this lesson, you will perform calculations using more than one operation.

Explore

To win a contest, Harry's dad must answer this skill-testing question:

$$9 + 3 \times 6 - 4 = \underline{\hspace{2cm}}$$

- Find the answer in as many ways as you can.
 - Record the strategy you use for each method.
 - The correct answer is 23.
- Which strategy gives this answer?



Show and Share

Share your work with another student.

Discuss how to rewrite the question so the only possible answer is 23.

Connect

When you solve a problem that uses more than one operation, the answer depends on the order in which you perform the operations.

Solve the expression: $3 + 6 \times 4$

If you add first, you get: $9 \times 4 = 36$

If you multiply first, you get: $3 + 24 = 27$

To avoid getting two answers, there is a rule that multiplication is done before addition.

So, $3 + 6 \times 4 = 3 + 24 = 27$, which is the correct answer

An **expression** is a mathematical statement with numbers and operations. When we calculate the answer, we solve the expression.

We use brackets if we want certain operations carried out first.

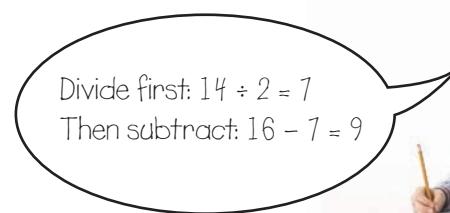
To make sure everyone gets the same answer when solving an expression, we use this order of operations:



- Do the operations in brackets.
- Multiply and divide, in order, from left to right.
- Then add and subtract, in order, from left to right.

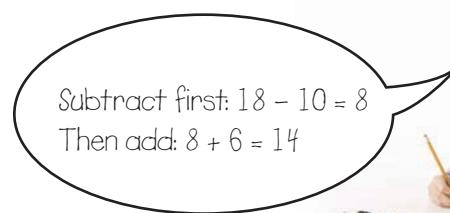
► Solve: $16 - 14 \div 2$

$$\begin{aligned} 16 - 14 \div 2 \\ = 16 - 7 \\ = 9 \end{aligned}$$



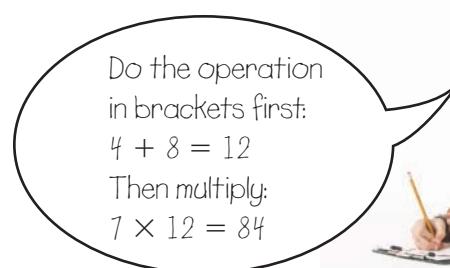
► Solve: $18 - 10 + 6$

$$\begin{aligned} 18 - 10 + 6 \\ = 8 + 6 \\ = 14 \end{aligned}$$



► Solve: $7 \times (4 + 8)$

$$\begin{aligned} 7 \times (4 + 8) \\ = 7 \times 12 \\ = 84 \end{aligned}$$



The order of operations is:
Brackets
Multiply and Divide
Add and Subtract



Practice

1. Solve each expression.

Use the order of operations.

- a) $18 + 4 \times 2$ b) $25 - 12 \div 3$ c) $24 + 36 \div 9$
d) $12 - 8 - 4$ e) $50 - 7 \times 6$ f) $7 \times (2 + 9)$
g) $81 \div 9 - 6$ h) $25 \div (9 - 4)$ i) $13 - 6 + 8$



2. Some calculators follow the order of operations.

Others do not.

Press: 9 $\boxed{+}$ 6 $\boxed{\times}$ 3 $\boxed{=}$

Does your calculator follow the order of operations?

Explain how you know.



3. Bianca entered $52 \boxed{+} 8 \boxed{\times} 2 \boxed{=}$ in her calculator.

She got the answer 120.

In what order did Bianca's calculator perform the operations?

How do you know?



4. Use mental math to solve.

- a) $20\,000 - 4000 \times 2$ b) $6 + 125 \div 25$
c) $(1000 + 6000) \times 3$ d) $60 \times 3 \div 9$
e) $5 \times (4 + 11)$ f) $50 + 50 \div 50$
g) $(50 + 50) \div 50$ h) $(9 \times 10) - (30 + 30)$
i) $16 \div 2 \times 9$ j) $200 - (200 \div 20)$

5. Use mental math to solve.

- a) $4 \times 7 - 2 + 1$ b) $4 \times (7 - 2) + 1$
c) $4 \times 7 - (2 - 1)$ d) $4 \times (7 - 2 + 1)$
e) $(4 \times 7 - 2) + 1$ f) $4 \times 7 - (2 + 1)$

Which expression gives the greatest answer?

The least answer?



6. Use the numbers 2, 3, and 4 and any operations or brackets.

Write an expression that equals each number.

- a) 9 b) 10 c) 14 d) 20 e) 6

Try to do this more than one way.

7. How many different answers can you get by inserting one pair of brackets in this expression?

$$10 + 6 - 4 \div 2 \times 3$$

Write each expression, then solve it.

8. Alexi bought 5 T-shirts for \$12 each and 3 pairs of socks for \$2 a pair. Which expression shows how much Alexi spent in dollars? Explain.

- a) $5 \times 12 \times 3 \times 2$
- b) $5 \times 12 + 3 \times 2$
- c) $(5 + 3) \times (12 + 2)$



9. Choose mental math, a calculator, or paper and pencil to solve.

For each question, how did you decide which method to use?

- a) $238 - (2 \times 73)$
- b) $47 \times (16 \times 18)$
- c) $(36 + 14) \div 10$
- d) $36 \times (48 \times 8)$
- e) $60 \times (4 \div 2)$
- f) $(200 + 50) \times (9 \div 3)$

10. Mr. Bradshaw bought 2 boxes of fruit bars for his 3 children.

Each box has 6 fruit bars.

The children shared the fruit bars equally.

How many fruit bars did each child get?

Write a number sentence to show the order of operations you used.



11. Copy each number sentence.

Use brackets to make each number sentence true.

- a) $36 \div 4 \times 3 = 3$
- b) $20 \div 5 \times 2 + 3 = 5$
- c) $10 - 4 \div 2 - 1 = 6$

Reflect

Why do we need rules for the order in which we perform operations?

Give examples to support your answer.

Numbers Every Day

Number Strategies

Write each number in expanded form, and in words.

- 26 408 579
- 103 568 904
- 400 017
- 9 872 003
- 89 000 200

Ooops Bingo!



You will need:

- a set of game cards
- counters
- a set of expression cards
- a paper bag
- a record sheet

The object of the game is to be the first player to correctly cover the whole game card.

Cut out the expression cards and put them in the paper bag.
Decide who will be the Game Keeper.

- The Game Keeper draws an expression card and shows it to the players.
Everyone solves the expression and records his work.
The Game Keeper uses a counter to cover the answer on the record sheet.
If possible, each player uses a counter to cover the answer on her game card.
- The game ends when one player has correctly covered a game card.
- Switch roles.
Play the game again.



Environmentalist



Environmentalists the world over are working hard to track species' populations. They want to understand the reasons for changes in their numbers, and to reverse the trend, when necessary.



Environmentalists cannot count all the animals and plants. Instead, they do smaller counts for a limited area, and then multiply to estimate regional and even worldwide populations. For example, when exploring the impact of factory fishing, they may count a sample and then estimate the total number of fish caught, and subtract this number from an estimate of the population.

The health of both the local environment and the food chain are crucial to species' survival. Every piece of data environmentalists collect helps in the effort to turn back the tide of extinctions.



Adding and Subtracting Whole Numbers

Explore



The table shows the number of cell phones sold at We Sell Cells in each of the first 4 months of the year.

- How many cell phones were sold altogether in the 4 months?
- By the end of the year, 12 854 cell phones had been sold.
How many phones were sold from May to December?

Cell Phone Sales

Month	Number of Phones
January	765
February	847
March	939
April	808

Show and Share

Share your work with another pair of students.

How did you decide which operations to use to solve the problems?

Did you use the same methods? Explain.

How can you check your answers?

Connect

- Maha's cell phone plan gives her 300 min of air time each month.

She used 298 min in June, 276 min in July, 287 min in August, and 248 min in September.

How many minutes did Maha use in the 4 months?

Add: $298 + 276 + 287 + 248$

Use place value to add.

Add the ones: 29 ones
Regroup as 2 tens 9 ones.

$$\begin{array}{r} 2 \\ 298 \\ 276 \\ 287 \\ + 248 \\ \hline 9 \end{array}$$

Add the tens: 30 tens
Regroup as 3 hundreds 0 tens.

$$\begin{array}{r} 3 \\ 298 \\ 276 \\ 287 \\ + 248 \\ \hline 09 \end{array}$$

Add the hundreds: 11 hundreds

$$\begin{array}{r} 3 \\ 298 \\ 276 \\ 287 \\ + 248 \\ \hline 1109 \end{array}$$

Estimate to check your answer is reasonable.

Round each number to the nearest 100.

298, 276, and 287 each round to 300.

248 rounds to 200.

$$300 + 300 + 300 + 200 = 1100$$

1109 is a reasonable answer.

Maha used 1109 min.



- Here is another way to find the sum $298 + 276 + 287 + 248$.

Add: $298 + 276$

$$\begin{array}{r} 298 \\ + 276 \\ \hline 574 \end{array}$$

Add: $574 + 287$

$$\begin{array}{r} 574 \\ + 287 \\ \hline 861 \end{array}$$

Then add: $861 + 248$

$$\begin{array}{r} 861 \\ + 248 \\ \hline 1109 \end{array}$$

- Maha's 3-year plan gives her a total of 10 800 min.

Suppose she used 9586 min in 3 years.

How many unused minutes does Maha have?

Subtract: $10\,800 - 9586$

Use place value to subtract.

You cannot take 6 ones from 0 ones.

There are no tens to regroup.

Regroup 8 hundreds as 7 hundreds 10 tens.

Regroup 10 tens as 9 tens 10 ones.

$$\begin{array}{r} & 9 \\ & 7 \ 10 \ 10 \\ 1 & 0 \ 8 \ 0 \ 0 \\ - & 9 \ 5 \ 8 \ 6 \\ \hline \end{array}$$

Subtract the ones.

Subtract the tens.

Subtract the hundreds.

To subtract the thousands,
regroup 1 ten thousand as 10 thousands.

$$\begin{array}{r} & 9 \\ & 10 \ 7 \ 10 \ 10 \\ 1 & 0 \ 8 \ 0 \ 0 \\ - & 9 \ 5 \ 8 \ 6 \\ \hline 1 & 2 \ 1 \ 4 \end{array}$$

Add to check your answer is correct.

The total number of used and unused minutes

should equal the total number of minutes in the plan.

Add: $9586 + 1214$

The sum should be 10 800.

$$9586 + 1214 = 10\,800$$

So, the answer is correct.

Maha has 1214 unused minutes.

Recall that adding
to check a subtraction is
using the inverse operation.
Addition is the inverse of
subtraction.



Practice

1. Add. Estimate to check.

a) 469

308

529

+ 637

b) 832

759

621

+ 500

c) 567

720

863

+ 144

d) 944

140

229

+ 687

e) 543

691

107

+ 420

f) 312

477

210

+ 390

2. Subtract. Use the inverse operation to check.

a) 5326

- 1417

b) 8004

- 5361

c) 4094

- 2397

d) 36 187

- 3 829

e) 52 109

- 763

f) 23 000

- 422

3. Derek emptied his 4 jars of pennies.

He counted 587 pennies from the first jar, 724 from the second, 611 from the third, and 801 from the fourth.

- a) How many pennies does Derek have?
 b) How much is that in dollars?

4. The table shows the numbers of 4 books in stock at a book depository.

Books	Number
Woodworking Wisdom	425
Butterflies	631
The Monarchy	214
Casserole Creations	523



- a) Find the total number of these books.
 b) The depository has a total of 10 402 books in stock.
 How many other books are in stock?
 Show how you know.

5. Write a story problem that could be solved by subtracting 4285 from 11 000.
 Trade problems with a classmate.
 Solve your classmate's problem.
6. This table shows the daily attendance at this year's Multicultural Festival.
 How many people attended the festival in total?



Multicultural Festival Attendance

Day	Attendance
Thursday	428
Friday	637
Saturday	958
Sunday	994

7. Jillian subtracted 9387 from a number.
 The difference was 3447. What was the number?
 Explain how you got your answer.
8. The sum of four 3-digit numbers is 3615.
 What might the four numbers be?
9. The sum of four consecutive 3-digit numbers is 866.
 What are the four numbers?
 Explain your strategy.
10. Find the missing digits.
 How many different ways can you do this?



Consecutive numbers are numbers such as 100, 101, 102, 103.

Reflect

Use mental math to find $12\ 000 - 5001$.
 Explain why it is easier to do this subtraction mentally than with paper and pencil.

$$\begin{array}{r}
 \square \ 7 \ 2 \\
 3 \ \square \ 4 \\
 \square \ 0 \ 5 \\
 + \ 8 \ 1 \ 6 \\
 \hline
 1 \ 9 \ 7 \ \square
 \end{array}$$

Numbers Every Day

Mental Math

Find each product.

$$60 \times 80$$

$$301 \times 6$$

$$49 \times 30$$

$$298 \times 5$$

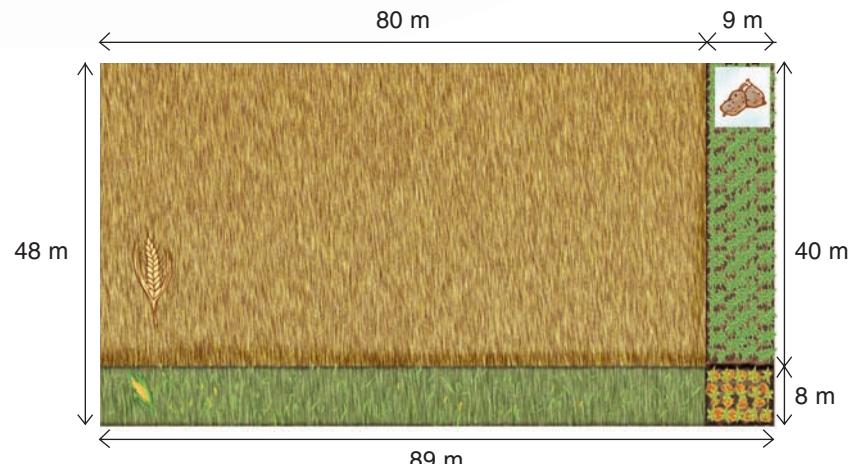
10

Multiplying Whole Numbers

Reza's field is 89 m long and 48 m wide.

She has divided the field into 4 sections.

How can you find the area of each section of the field? The whole field?



Explore

Patrick's orchard is rectangular. It measures 198 m by 82 m.

Find the area of Patrick's orchard.

Estimate to check your answer.

Show and Share

Share your solution with another student.

How is multiplying a 3-digit number by a 2-digit number the same as multiplying a 2-digit number by a 2-digit number?

How is it different?

Connect

Yolanda packed 68 cartons of DVDs. She put 197 DVDs in each carton.

How many DVDs did Yolanda pack?

The total number of DVDs is 68×197 .

- You can use an area model to multiply. Sketch a rectangle. Label the length and the width.

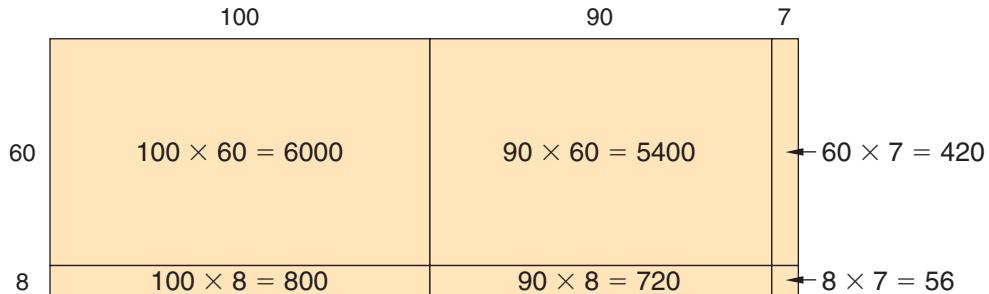
68

197

Divide the rectangle to show hundreds, tens, and ones.

Label the dimensions of the sections.

Find the area of each section.



Add the areas: $6000 + 5400 + 420 + 800 + 720 + 56 = 13\,396$

$$68 \times 197 = 13\,396$$

Yolanda packed 13 396 DVDs.



- You can break the numbers apart to multiply.

	197	$(100 + 90 + 7)$
	\times	68
Multiply: 8×7	56	
8×90	720	
8×100	800	
60×7	420	
60×90	5400	
60×100	$+ 6000$	
Add:	13396	

- You can use a short way to multiply.

	197	
	\times	68
Multiply: 197×8	1576	
Multiply: 197×60	$+ 11820$	
Add:	13396	

Multiplication and division
are inverse operations.
You can use one to check
the other.



- You can check by dividing.

The total number of DVDs divided by the number put in each carton should equal the number of cartons.

$$\text{Divide: } 13\,396 \div 197 = 68$$

So, 13 396 is the correct answer.



Practice



Use a calculator or estimate to check your answers.

1. Multiply.

a) 576×28

b) 408×53

c) 907×18

d) 631×87

2. Multiply.

a) 46×522

b) 71×534

c) 68×755

d) 36×494

e) 46×1522

f) 71×2534

g) 68×2755

h) 36×1494

3. One bottle holds 750 mL of lemonade.

How much lemonade will 24 bottles hold?

Give your answer in 2 different standard units of measurement.

4. Write a story problem that can be solved by multiplying a 3-digit number by a 2-digit number. Solve your problem. Show your work.



5. Param needs 375 g of chocolate chips for one batch of cookies.

He has two 2-kg bags of chocolate chips.

Does Param have enough chocolate chips to make 12 batches of cookies? Explain.



6. Find each product.

a) 825×52

b) 837×29

c) 66×77

d) 744×32

e) 397×17

f) 45×92

g) 807×28

h) 583×23

7. Choose the most appropriate method to find each product.

Describe how you decided which method to use.

a) 1146×83

b) 2500×25

c) 1346×85

d) 5400×60

e) 2868×57

f) 2843×41

g) 1954×15

h) 9250×18

8. Tanya and Adeola multiplied 399 by 25.
Tanya's answer was 2793. Adeola's answer was 9975.
- a) Whose answer is reasonable? Explain.
b) Explain the other student's error.
9. The ticket agent sold 357 adult tickets and 662 student tickets for a concert.
How much money did the ticket agent take in?



10. Estimate the product 47×294 .
Will the product be closer to 12 000 or to 15 000?
Explain.
11. The Fairview Secondary School community of 1854 students and 58 teachers attended a special performance of a play at the local theatre. The theatre has 49 rows of 48 seats each.
- a) Were any seats empty? How do you know?
b) If your answer to part a is yes, find the number of empty seats.
12. Use the digits 2, 3, 4, 5, 6, 7 to form a 4-digit number and a 2-digit number that result in:
- a) the greatest product
b) the least product
Show your work.

Reflect

Suppose you multiply a 4-digit number by a 2-digit number.
Will the product ever be a 7-digit number?
Use numbers and words to explain.

Numbers Every Day

Mental Math

Multiply.

$$37 \times 50$$

$$146 \times 80$$

$$197 \times 60$$

$$235 \times 90$$

Dividing by a 2-Digit Number

In this division sentence, which is the divisor?
The dividend? The quotient?

$$1437 \div 7 = 205 \text{ R}2$$

Explore



Use any materials you wish.

Gilbert has 15 sets of collector sports cards.
All the sets have equal numbers of cards.
Gilbert has 375 sports cards.
How many cards are in each set?
Show your work.



Show and Share

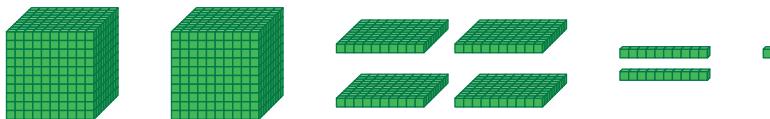
Share your solution with another pair of students.
What strategies did you use to solve the problem?

Connect

Melody has 2421 marbles to share equally among her 13 cousins.
How many marbles will each cousin get?

Divide: $13)2421$

- You can use Base Ten Blocks and place value to divide $2421 \div 13$.



You cannot divide 2 thousands into 13 groups.

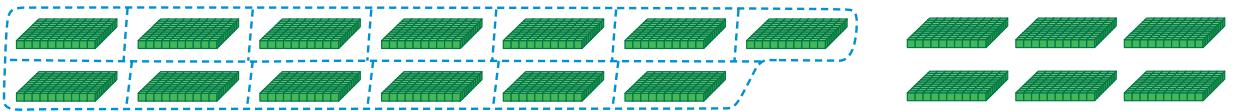
Trade 2 thousands for 20 hundreds.

$$20 \text{ hundreds} + 4 \text{ hundreds} = 24 \text{ hundreds}$$

Divide 24 hundreds into 13 groups.

Each group gets 1 hundred.

There are 11 hundreds left over.



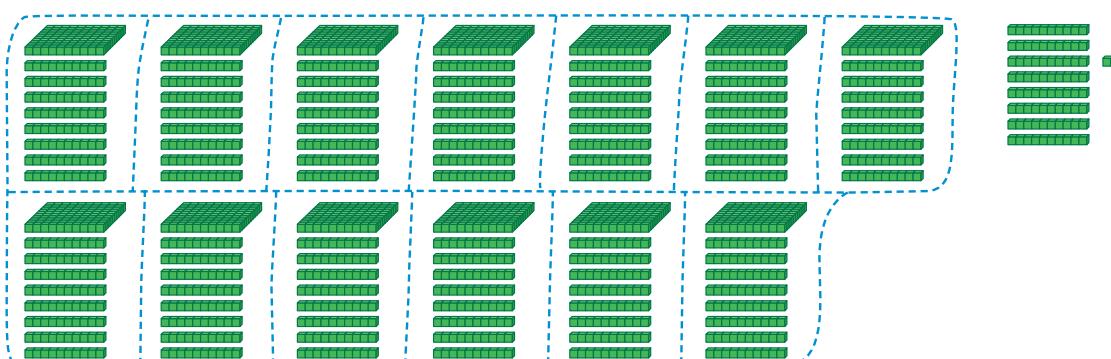
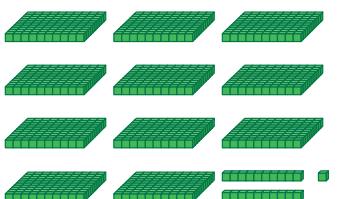
Trade 11 hundreds for 110 tens.

$$110 \text{ tens} + 2 \text{ tens} = 112 \text{ tens}$$

Divide 112 tens into 13 groups.

Each group gets 8 tens.

There are 8 tens left over.



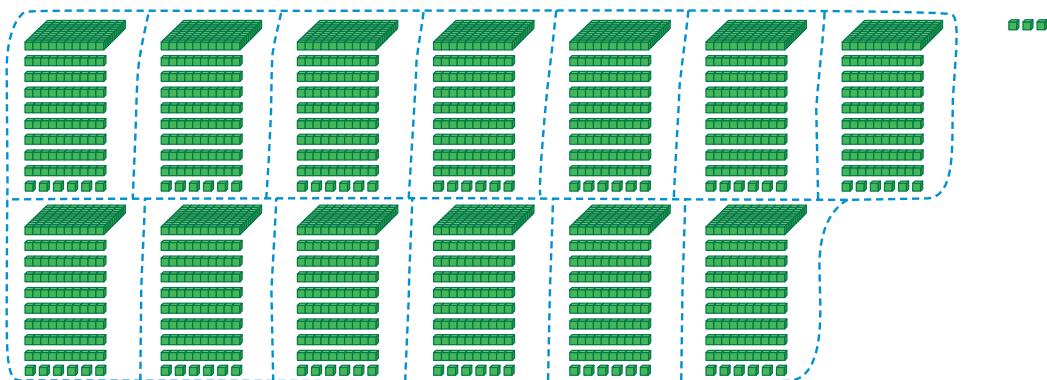
Trade 8 tens for 80 ones.

$$80 \text{ ones} + 1 \text{ one} = 81 \text{ ones}$$

Divide 81 ones into 13 groups.

Each group gets 6 ones.

There are 3 ones left over.



$$\text{So, } 2421 \div 13 = 186 \text{ R}3$$

- Here is another way to divide 2421 marbles into 13 equal groups.

Put each listed amount into each group, then subtract: $13 \overline{)2421}$

• 100 marbles	13×100	$\begin{array}{r} - 1300 \\ \hline 1121 \end{array}$	100
• 50 marbles	13×50	$\begin{array}{r} - 650 \\ \hline 471 \end{array}$	50
• 20 marbles	13×20	$\begin{array}{r} - 260 \\ \hline 211 \end{array}$	20
• 10 marbles	13×10	$\begin{array}{r} - 130 \\ \hline 81 \end{array}$	10
• 5 marbles	13×5	$\begin{array}{r} - 65 \\ \hline 16 \end{array}$	5
• 1 marble	13×1	$\begin{array}{r} - 13 \\ \hline 3 \end{array}$	+ 1
			186

$$2421 \div 13 = 186 \text{ R}3$$

Each cousin gets 186 marbles and there are 3 marbles left over.

To check the answer, multiply 186 by 13 and then add the leftover 3:

$$\begin{array}{r} 186 \\ \times \quad 13 \\ \hline 558 \\ + 1860 \\ \hline 2418 \end{array} \quad 2418 + 3 = 2421$$

This is the number of marbles at the beginning, so the answer is correct.

Practice

1. Divide. Multiply to check each answer.

a) $14 \overline{)2487}$	b) $36 \overline{)8543}$	c) $43 \overline{)2623}$
d) $29 \overline{)6480}$	e) $57 \overline{)6069}$	f) $43 \overline{)4900}$

2. Find each quotient. Check each answer.

a) $5604 \div 79$	b) $1368 \div 42$	c) $7603 \div 73$
d) $6870 \div 63$	e) $6914 \div 23$	f) $7727 \div 25$

3. Choose the most appropriate method to find each quotient.

Describe how you decided which method to use.

a) $20 \overline{)6000}$	b) $45 \overline{)9068}$	c) $38 \overline{)9768}$
d) $4045 \div 92$	e) $250 \div 25$	f) $1936 \div 12$

4. Mr. Talby's hens laid 1098 eggs this past month.
How many dozen is that?
5. The attendance at today's baseball game is 4344.
Each row of bleachers holds 48 people.
How many rows of bleachers could be filled?
6. A hockey team sold 1246 raffle tickets in 45 days.
About how many raffle tickets per day is that?



7. Copy each table.
Complete each table. What patterns do you see?

a)

Dividend	Divisor	Quotient
1955	23	
	23	86
2001	23	

b)

Dividend	Divisor	Quotient
2193	43	
2244	44	
2295		51

8. Copy each division sentence.

Replace each \square with a number from the tables so the division sentence is true.
Show your work.

- a) $\square \div \square = 44 \text{ R}3$
b) $\square \div \square = 63$
c) $\square \div \square = 101 \text{ R}11$
d) $\square \div \square = 31 \text{ R}53$



9. The food bank received 30 cases of 24 cans of soup, and 20 cases of 48 cans of soup.
How many packages of 14 cans of soup can be made?
10. Write a problem that can be solved by dividing a 4-digit number by a 2-digit number.
Solve your problem. Show your work.

Reflect

Suppose you divide a 4-digit whole number by a 2-digit whole number.
Will the quotient ever be a 4-digit whole number?
Use words and numbers to explain.

Dividends	Divisors
2536	58
1851	42
3654	25

Numbers Every Day

Number Strategies

Order these numbers from least to greatest.

7 048 963, 71 048 963,
704 896, 7 408 963,
74 018 963, 7 840 369

Another Method for Dividing

When the weather turns cold and the days get shorter, many aquatic animals move to warmer waters.

Finback whales migrate about 8000 km from the Bering Sea and the Arctic Ocean to the warmer Indian Ocean.

The journey takes a month or more.



Explore



Suppose a finback whale travels 8055 km in 34 days.

About how far does it travel each day?

Estimate first. Then use any strategy you like to solve this problem.

Show your work.

Show and Share

Compare your work with that of another pair of students.

Which strategies did you use?

How did you decide what to do with the remainder part of your quotient?

Connect

Some beluga whales took 58 days to travel 4840 km along the Arctic coast from the Beaufort Sea to the waters around Baffin Island. About how far did the whales travel each day?

Divide: $58 \overline{)4840}$

► Estimate first:

Round 58 to 60.

Round 4840 to 4800.

Since $48 \div 6 = 8$, $4800 \div 60$ is 80.

So, $4840 \div 58$ is about 80.

You can also estimate by thinking multiplication.
 $60 \times 80 = 4800$
 So, $4840 \div 58$ is about 80.

- Use place value to divide.

Step 1

We cannot divide 4 thousands into 58 groups.

Trade 4 thousands for 40 hundreds.

$$40 \text{ hundreds} + 8 \text{ hundreds} = 48 \text{ hundreds}$$

We cannot divide 48 hundreds into 58 groups.

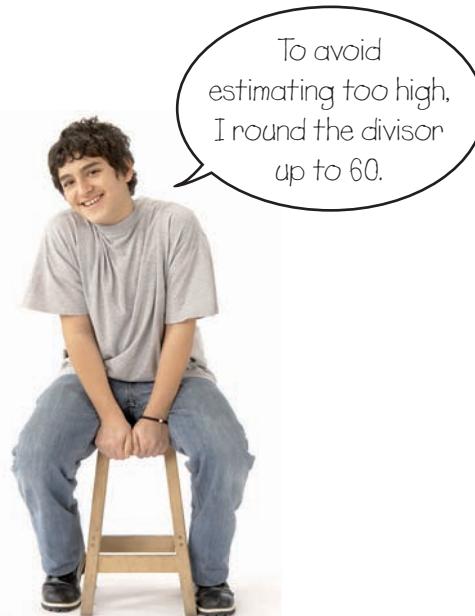
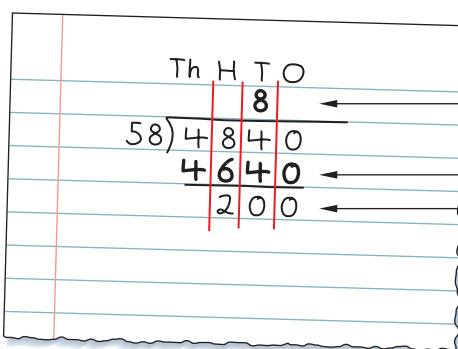
Trade 48 hundreds for 480 tens.

$$480 \text{ tens} + 4 \text{ tens} = 484 \text{ tens}$$

Round to estimate.

58 is close to 60. 484 tens is close to 480 tens.

$$480 \text{ tens} \div 60 = 8 \text{ tens}$$



Step 2

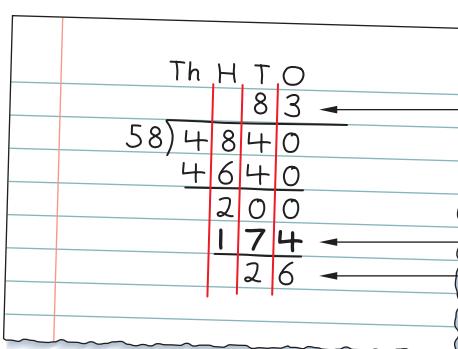
Divide 200 ones into 58 equal groups.

Round to estimate. 200 is between 180 and 240.

$$180 \div 60 = 3$$

$$240 \div 60 = 4$$

So, $200 \div 60$ is between 3 and 4.



$$4840 \div 58 = 83 \text{ R}26$$

We write $83 \text{ R}26$ as $83\frac{26}{58}$.

We do not want to report the distance using a remainder or a fraction.

The fraction $\frac{26}{58}$ is about $\frac{30}{60}$, which is $\frac{1}{2}$ or 0.5.

So, we write $83\frac{26}{58}$ as about 83.5.

The whales travelled about 83.5 km each day.

► Compare the quotient with your estimate:

83.5 is close to 80.

So, 83.5 is a reasonable answer.

► To check your answer, multiply 83 by 58 and then add the remainder, 26:

$$\begin{array}{r} 83 \\ \times \quad 58 \\ \hline 664 \\ + 4150 \\ \hline 4814 \end{array} \qquad 4814 + 26 = 4840$$

So, 83 R26 is the correct answer.

Practice

Use remainders where appropriate.

1. Divide, then check.

a) $73\overline{)8541}$

e) $58\overline{)6076}$

b) $62\overline{)9347}$

f) $97\overline{)1047}$

c) $45\overline{)6300}$

g) $42\overline{)8694}$

d) $38\overline{)3521}$

h) $60\overline{)6534}$

2. Estimate each quotient. Then divide.

a) $93 \div 21$

d) $9243 \div 46$

b) $208 \div 73$

e) $6843 \div 15$

c) $3550 \div 50$

f) $7812 \div 93$

3. In the fall, Monarch butterflies migrate to central Mexico.

The trip is about 4000 km. Suppose they fly 75 km each day.

About how long does it take the butterflies to reach Mexico?

4. Lucinda's great-grandfather is 1074 months old.

How old is he in years?

5. The Festival of the Midnight Sun Theatre

has 7875 seats arranged in 75 equal rows.

How many seats are in each row?

6. A DVD player costs \$81, including tax.

How many DVD players can be bought for \$3000?

7. Without dividing, predict which division question

has the greatest quotient. The least quotient.

Explain your prediction. Divide to check.

a) $43\overline{)7638}$

b) $19\overline{)8614}$

c) $85\overline{)7689}$



8. Use mental math, paper and pencil, or a calculator to find each quotient.
How did you decide which method to use?

a) $68 \overline{)4735}$

b) $12 \overline{)6000}$

c) $5679 \overline{)85\ 185}$

9. A lunar probe took 4316 photographs of the moon's surface. Thirty-two photographs had to be discarded. The remainder were divided among 42 scientists to be studied. How many photographs did each scientist study?



10. The owners of a building renovated 18 apartments. Painting cost \$5580 and new lights cost \$3186. What was the cost for each apartment?



11. a) Write a division question with a divisor of 73, a quotient of 105, and a remainder of 34.
b) Write a story problem using your division question.
Solve your problem.

12. A rectangular sheet of cardboard measures 64 cm by 15 cm. Suppose the width is changed to 16 cm. What would the length have to be for the rectangle to have the same area?



13. A newspaper prints 8762 papers. Each paper has 16 pages. A roll of newsprint can be used to print 6150 pages. How many rolls of newsprint are required?

14. A radio station received 3815 phone calls in 35 min. How many calls would it expect to receive in 1 h?

15. A 22-m by 14-m rectangular yard is to be seeded. Each bag of seed covers 18 m^2 . How many bags of seed are needed?

Reflect

Without dividing, how can you tell the quotient $3534 \div 57$ has 2 digits? Explain.

Numbers Every Day

Calculator Skills

Find 3 prime numbers that have a product of 12 121 and a sum of 71.

Unit 2

Show What You Know

LESSON

- 1** 1. How many days is 1 million minutes?
- 2** 2. Write each number in standard form.
 - a) $20\,000\,000 + 3\,000\,000 + 60\,000 + 4000 + 900 + 7$
 - b) 3 billion 400 thousand 7 hundred
 - c) twenty-seven million fifty-seven thousand five hundred sixty-two
3. Write each number in expanded form.
 - a) 14 086 368
 - b) 1 730 002
 - c) 857 293 179
4. Write the value of each underlined digit.
 - a) 47 681 042
 - b) 7 67 6 425
 - c) 500 700 235
- 3** 5. Write these numbers in order from least to greatest:
36 001 304 9 495 627 36 001 523
- 4** 6. List the first 3 common multiples of 4, 5, and 6.
Explain how you know the numbers you find are common multiples.
7. Suppose you want to buy the same number of wieners and buns.
How many packages of each would you buy?
Give 3 different answers.
- 5** 8. Tell if each number is prime or composite.
How do you know?
Write each composite number as a product of prime factors.
 - a) 13
 - b) 21
 - c) 46
 - d) 36
9. Only one prime number is even.
Which number is it?
How do you know it is a prime number?
- 7** 10. Use mental math to solve.
 - a) $150 \times 16 \times 2$
 - b) $240 + 83 + 160$
 - c) 28×4
- 8** 11. Use the order of operations to solve.
 - a) $35 - 16 \div 4$
 - b) $8 \times (6 + 4)$
 - c) $86 - 9 \times 9$

LESSON

9

- 12.** Estimate first. Then find each sum or difference.

a) $572 + 368 + 427 + 385$

c) $76\ 423$
 $\underline{-\ 9\ 389}$

b) $199 + 402 + 350 + 797$

d) $82\ 003$
 $\underline{-\ 8\ 114}$

e) 8707
 $\underline{-\ 3842}$

10

- 13.** Multiply.

Estimate to check your answers.

a) 685
 $\times\ 26$

b) 2497
 $\times\ 84$

c) 1997
 $\times\ 68$

11
12

- 14.** Divide.

Check the quotients by using the inverse operation.

a) $27)\overline{4539}$

b) $72)\overline{7800}$

c) $24)\overline{1638}$

d) $34)\overline{3325}$

- 15.** Frankie has 1350 collector cards.

He can fit 12 on each page of a scrapbook. How many pages can Frankie fill?

- 16.** Mrs. Li has 107 beehives.

She harvested about 64 kg of honey per hive. About how many kilograms of honey did Mrs. Li harvest?

- 17.** Sandhya has to bank 331 pennies, 15 nickels,

183 dimes, and 212 quarters from her piggy bank. She rolls as many coins as possible.

A roll holds 50 pennies, 40 nickels, 50 dimes, or 40 quarters.

- a) How many rolls of each type of coin did she take to the bank?

- b) What was Sandhya's total bank deposit?



UNIT 2

Learning Goals

- read and write whole numbers in standard, expanded, and written forms
- use place value to represent and read whole numbers
- compare and order whole numbers
- identify and describe multiples and factors to 100
- identify and describe composite and prime numbers to 100
- use order of operations
- estimate sums, differences, products, and quotients
- use mental math to add, subtract, multiply, and divide
- add four 3-digit numbers and subtract from a 5-digit number
- multiply and divide by a 2-digit number
- pose and solve multistep problems

Unit Problem

At the Apiary



In 2000, there were 603 828 hives in Canada. The average number of hives per beekeeper was 61, and the average yield of honey per hive was 52 kg.



Check List

Your work should show

- that you can choose the correct operation
- how you calculated and checked your solutions
- an interesting story problem involving whole numbers
- clear explanations of your solutions and strategies

Solve each of questions 1 to 3.

Check your solutions. Show all your work.

1. During her busy season, about how many eggs does the queen bee lay each hour? Each minute?
2. Each day, the queen bee eats 80 times her mass in food.

Suppose you needed to eat 80 times your mass each day.

How many kilograms of food would you eat each day?
Each month?

3. The typical Canadian eats about 880 g of honey each year.
Millicent is 12 years old.
She estimates she has eaten about 10.5 kg
of honey in her lifetime.
Is Millicent a typical Canadian honey eater? Explain.
4. Use some of the honeybee data on page 78
or use data you can find about honeybees.
Write a story problem.
Solve the problem.
Describe your solution strategy.

Reflect on the Unit

Explain how you decide which computation method (mental math, paper and pencil, estimation, or calculator) to use when calculating with whole numbers.

