

1

Charity Fund-raising

Learning Goals

- use a pattern rule to describe a pattern
- make predictions about terms in a pattern
- use a variable to describe a pattern
- use a variable to write equations
- solve equations to solve problems

Equations

After cancer surgery, Terry Fox decided to run across Canada to raise funds for cancer research. He created the "Marathon of Hope," which continues to raise funds today.

Every September, people around the world take part in the Terry Fox Run.

The run raises millions of dollars for cancer research.

This September, Carly will run 10 km.

Carly made this table to find out how much she would get from each pledge.

Amount per Kilometre	Amount of Pledge
10¢	\$1.00
20¢	\$2.00
30¢	\$3.00
40¢	\$4.00
50¢	\$5.00

Carly will run around a 400-m track.

Here is part of a table. It shows how many laps Carly needs to complete, to run 10 000 m.

Number of Laps	Distance in Metres
1	400
2	800
3	1200
4	1600
5	2000

- What patterns do you see in the tables?
- One of Carly's friends pledged 60¢ per kilometre. What is the amount of this pledge?
- How could you find out how many laps Carly will run?

Key Words

increasing pattern

consecutive numbers

variable

expression

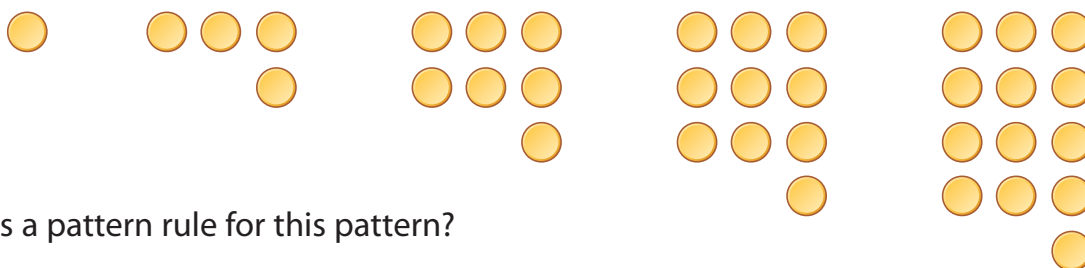
solution

by inspection

Number Patterns and Pattern Rules

How would you describe this pattern?

What type of pattern is it?



What is a pattern rule for this pattern?

Explore



➤ For each number pattern below:

Identify a pattern rule.

Write the next 5 terms.

What did you do to one term to get the next term?

- 3, 4, 6, 9, 13, ...
- 3, 4, 6, 7, 9, ...
- 1, 4, 3, 6, 5, 8, ...
- 1, 2, 5, 10, 17, 26, ...

➤ Choose one pattern above.

Use counters to show the pattern and to check that the next 2 terms were correct.

➤ Make up a similar pattern.

Trade patterns with another pair of classmates.
Write a rule for your classmates' pattern.



Show and Share

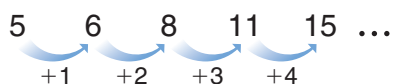
Share your patterns with other classmates.

How do you know each pattern rule is correct?

For any pattern, did you find more than one rule? Explain.

Connect

► Here is a number pattern.



Each time, I add 1 more than I added before. This is an increasing pattern.

A pattern rule is:

Start at 5. Add 1.

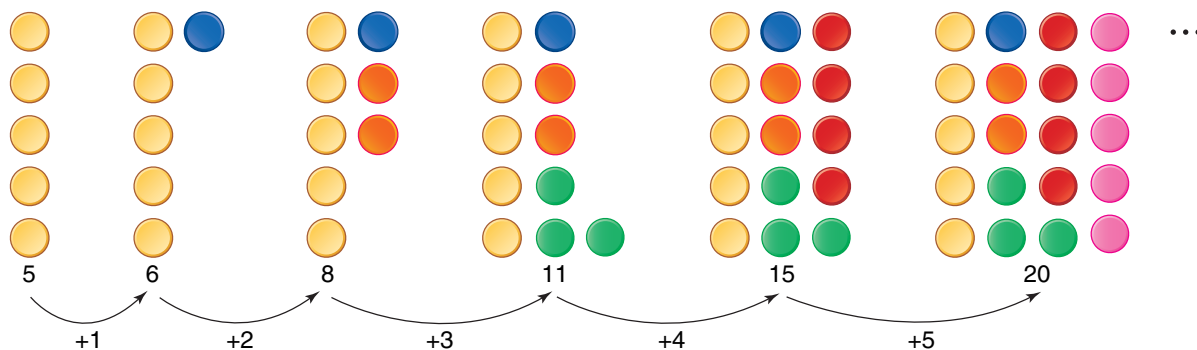
Increase the number you add by 1 each time.

To get the next 5 terms, continue to

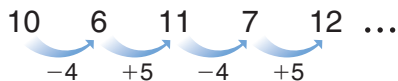
increase the number you add by 1 each time.

5, 6, 8, 11, 15, 20, 26, 33, 41, 50, ...

We can use counters to show the pattern.



► Here is another number pattern.



I use mental math to subtract and add.

A pattern rule is:

Start at 10. Alternately subtract 4, then add 5.

To get the next 5 terms, continue to subtract 4, then add 5.

10, 6, 11, 7, 12, 8, 13, 9, 14, 10, ...

When we alternately subtract, then add, there are two patterns in one.



Practice

- Write the first 5 terms of each pattern.
 - Start at 3. Add 2 each time.
 - Start at 1. Add 2. Increase the number you add by 1 each time.
- For each pattern in question 1:
 - Use counters to show the first 5 terms.
 - Predict the next 2 terms.
 - Use counters to check your predictions.
- Write the next 4 terms in each pattern.
Write each pattern rule.
What did you do to each term to get the next term?
 - 1, 2, 4, 5, 7, 8, ...
 - 2, 4, 3, 5, 4, 6, 5, ...
 - 98, 85, 87, 74, 76, ...
 - 1, 10, 7, 70, 67, 670, ...
- Find each missing term. Describe the pattern.
 - 3, 23, 13, 33, \square , 43, 33, ...
 - 99, 98, 198, 197, \square , 296, 396, ...
 - 2, 22, 12, 132, 122, 1342, \square , ...
- What is the 7th term of this pattern?
Start at 200. Subtract 8 each time.
How could you find the 7th term without writing the first 6 terms?
- What is the 10th term of this pattern?
Start at 13. Alternately subtract 4, then add 5.
- The first 2 terms of a pattern are 6, 12, ...
How many different patterns can you write with these 2 terms?
For each pattern, list the first 6 terms and write the pattern rule.
Show your work.



Reflect

How do you find the pattern rule for a number pattern?
Use an example to explain.

Using Patterns to Solve Problems

What are the missing numbers?
How do you know?



Explore

Sam charges \$6 for each hour he baby-sits.

- How much does Sam earn when he works 2 hours? 3 hours? 4 hours? 5 hours?
Show your results in a table.

Time Worked (hours)	Money Earned (\$)
1	6

- What patterns do you see in the table?
How is each term different from the term before?
Use the patterns to predict how much Sam will earn working 21 hours.
- Will Sam earn exactly \$40? \$45? \$50?
How do you know?
- Sam saves all the money he earns.
He needs \$250 to buy a mountain bike.
How many hours does Sam need to work?
- Make up your own problem you can solve using this table.
Trade problems with another pair of classmates.
Solve your classmates' problem.



Show and Share

Share your answers with your classmates.
Did you solve the problems the same way? Explain.

Connect

One puzzle book costs \$17.

- How much does it cost to buy 2 books? 3 books? 4 books?

Make a table.

When you add 1 to the number of books, you add \$17 to the cost.

Two books cost \$34.

Three books cost \$51.

Four books cost \$68.

Number of Books	Cost (\$)
1	17
2	34
3	51
4	68

These numbers are multiples of 17.

- Use a pattern to predict the cost of 20 books.

One pattern rule for the cost is:

Start at 17. Add 17 each time.

Another pattern rule for the cost is:

The number of books multiplied by 17



To predict the cost of 20 books, multiply: $20 \times 17 = 340$
Twenty books cost \$340.

- Suppose you have \$200.
Can you buy puzzle books and have no money left over?

Extend the pattern to see if 200 is a term.
Use a calculator.



Continue to add 17:
17, 34, 51, 68, 85, 102, 119, 136, 153, 170, 187, 204, ...

Two consecutive terms are 187 and 204.

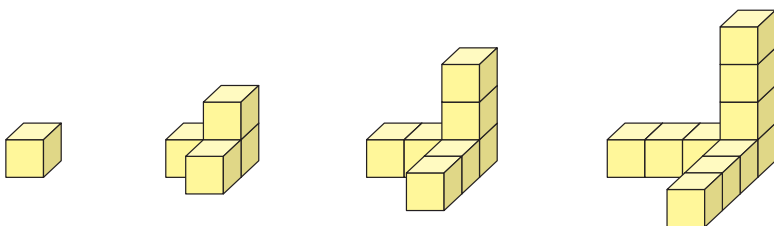
So, 200 is not a term in the pattern.
If you try to spend \$200, you will have money left over.

When one number follows another number, the numbers are **consecutive**.



Practice

1. Here is a pattern of linking cubes.



Object 1 Object 2 Object 3 Object 4

The pattern continues. Use linking cubes.

a) Make the next two objects.

b) Copy and complete this table for the first 6 objects.

Object	Number of Cubes
1	1

c) How does the pattern grow?

Write a pattern rule for the number of cubes.

d) How many cubes will there be in the 10th object?

How do you know?

e) Will any object have 50 cubes? 51 cubes? How do you know?

2. The pattern in this table continues.

Number of CDs	Cost (\$)
1	16
2	32
3	48
4	64
5	

a) Which of these numbers is the next term in the *Cost* column?

77, 78, 79, 80, 81

How do you know?

b) Write a pattern rule for the cost in dollars.

c) Write the next 5 terms in the *Cost* column.

d) How is each term in the *Cost* column different from the term before?

How is each term different from the following term?

Math Link

Nature

In a beehive, bees make honeycomb to store their honey. The cells in the honeycomb form a pattern.



3. Hilary delivers newspapers. Each week she collects \$25.
- How much money has Hilary collected at the end of 1 week? 2 weeks?
 - Make a table to show the amounts for the first 8 weeks.
 - How is each amount different from the amount before?
 - How much will Hilary collect in total in 3 weeks?
 - Will Hilary ever collect a total of \$240? \$250? \$260?
How do you know?
 - Write a problem you could solve using the table in part b.
Solve your problem.

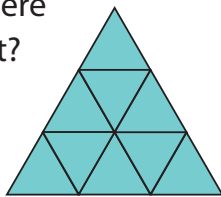


4. The sunflower is the only single flower that grows as high as 300 cm.
Suppose it grows 30 cm each week.
In which week could a sunflower reach a height of 300 cm? Explain.



5. Dave read 40 pages on Monday, 37 pages on Tuesday, and 34 pages on Wednesday.
This pattern of pages read continued until Dave finished his book.
- Which of the numbers below is the number of pages Dave read on Thursday? How do you know?
29, 30, 31, 32, 33
 - What was the total number of pages Dave read the first 7 days?
 - Dave finished his book on the day he read 1 page.
How many pages are in the book?
Show your work.

6. Look at this shape.
- How many triangles are there with a side length of 1 unit?
2 units? 3 units?
 - How many triangles are in this shape?



Reflect

How can using patterns help you solve problems?
Use an example from this lesson to explain.

At Home



What number patterns do you see at home?
Look through magazines, newspapers, and around your community.
Write about the patterns you see.
How is each term different from the term before?

Using a Variable to Describe a Pattern

Explore



You will need green Pattern Blocks and triangular dot paper.
The side length of the block is shown.



- Make an increasing pattern with the blocks.
Draw each figure in the pattern on dot paper.
- What is the perimeter of each figure?
- Copy and complete this table for the first 3 figures.

Figure Number	Perimeter (units)
1	

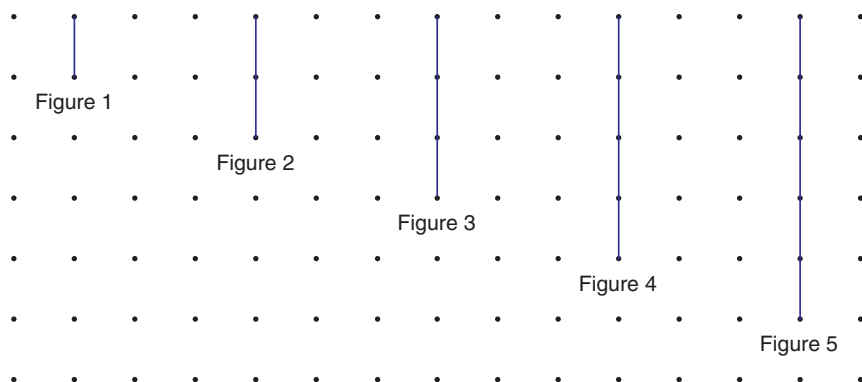
- Continue the pattern.
Make the next 3 figures.
Draw these figures on dot paper.
Extend the table for these 3 figures.
- What patterns do you see in the table?
How is each perimeter different from the perimeter before?
How is the perimeter related to the figure number?



Show and Share

Compare your table with that of another pair of students.
Suppose you know the figure number.
What would you do to get the perimeter of the figure?
What is the perimeter of the 100th figure? The 200th figure?

➤ Here is a pattern of line segments drawn on dot paper.



The table shows each figure number and the number of dots on the figure.

Figure Number	Number of Dots
1	$2 = 1 + 1$
2	$3 = 2 + 1$
3	$4 = 3 + 1$
4	$5 = 4 + 1$
5	$6 = 5 + 1$

The number of dots is 1 more than the figure number.

We can write each number of dots as this sum: Figure number + 1

We can use a letter, such as f , to represent any figure number.

f is called a **variable**.

Then, the number of dots on Figure f is $f + 1$.

$f + 1$ is an **expression** that represents the pattern in the numbers of dots.

A variable is shown in italics.

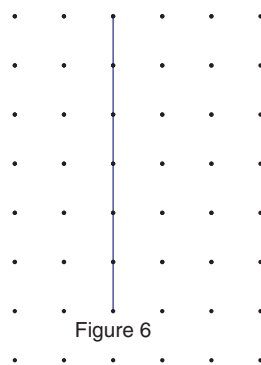
We can check that this expression is correct.

For the number of dots on the 6th figure, replace f with 6.

$$\begin{aligned} \text{Then, } f + 1 &= 6 + 1 \\ &= 7 \end{aligned}$$

The 6th figure has 7 dots.

We continue the pattern above to verify this.



- We can use a variable to write a pattern rule.

Look at this pattern: 7, 8, 9, 10, 11, . . .

Each term is 1 more than the preceding term.

Look for a way to relate the value of a term to its position in the pattern.

Term Position	Term Value
1	$7 = 1 + 6$
2	$8 = 2 + 6$
3	$9 = 3 + 6$
4	$10 = 4 + 6$
5	$11 = 5 + 6$

Let n represent any term position.

Then, the term value is $n + 6$.

So, an expression for the pattern rule is $n + 6$.

We can check that the expression $n + 6$ is correct.

For the 5th term, replace n with 5.

$$\begin{aligned} n + 6 &= 5 + 6 \\ &= 11 \end{aligned}$$

This matches the value of the 5th term in the table above.

So, the expression is correct.

Practice

1. For the pattern below:

a) Copy and complete the table.

b) Write an expression to represent the pattern in the numbers of dots.



Figure 1

Figure 2

Figure 3

Figure 4

Figure 5

Figure Number	Number of Dots

2. For the pattern below:

a) Copy and complete the table.

b) Write an expression to represent the pattern in the numbers of squares.

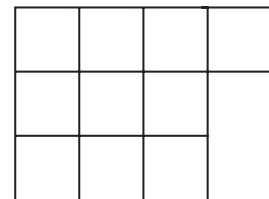
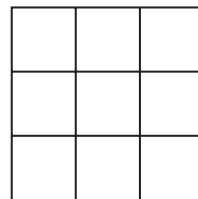
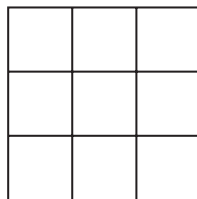
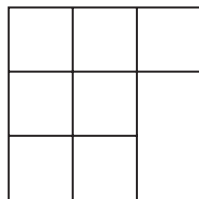


Figure 1

Figure 2

Figure 3

Figure 4

Figure 5

Figure Number	Number of Squares

3. For each table, write an expression for the number of dots in any figure.
Check that each expression is correct.

a)

Figure Number	Number of Dots
1	5
2	6
3	7
4	8
5	9
6	10

b)

Figure Number	Number of Dots
1	6
2	7
3	8
4	9
5	10
6	11

c)

Figure Number	Number of Dots
1	0
2	1
3	2
4	3
5	4
6	5

4. Use a variable to write a pattern rule for each number pattern.

a) 2, 3, 4, 5, 6, 7, ...

b) 10, 11, 12, 13, 14, 15, ...

c) 8, 9, 10, 11, 12, 13, ...

5. Find the 100th term in each pattern in question 4.
Explain how you did this.



6. Write an expression for each number pattern.

Write the next 5 terms in each pattern.

Explain how you know the expressions and terms are correct.

a) 15, 16, 17, 18, 19, ...

b) 16, 17, 18, 19, 20, ...

Show your work.

7. Here are some decreasing patterns.

Match each pattern with an expression below.

How can you check that you are correct?

a) 99, 98, 97, 96, 95, ...

b) 34, 33, 32, 31, 30, ...

c) 50, 49, 48, 47, 46, ...

A. $51 - t$

B. $35 - t$

C. $100 - t$

8. Use a variable to write a pattern rule for each number pattern.

a) 10, 9, 8, 7, 6, 5, ...

b) 40, 39, 38, 37, 36, 35, ...

c) 1000, 999, 998, 997, 996, ...

How is each pattern different from the patterns in question 4?

Reflect

How can using a variable help you represent a pattern?
Use words, numbers, or pictures to explain.

Tic-Tac-Toe Challenge



You will need 1-cm grid paper.
Think about the game Tic-Tac-Toe.
On a 3 by 3 grid, people take turns
to write X or O.
The winner is the person who gets
3 in a row, column, or diagonal.

O		X
	O	X
		X

Try Tic-Tac-Toe on a 4 by 4 grid.
Take turns to write X or O in a grid
square until one person gets 3 in a row.

Play the game several times.
Try to find a strategy so the person
who plays first always wins.
Where does that person write her first X or O?

Variation: Play Tic-Tac-Toe on a 4 by 4 grid so the first person to
get 4 in a row *loses*.



Strategies Toolkit

Explore



Two students stretch a piece of modelling clay until it breaks into 2 pieces. This is Round 1.

The students then stretch each new piece until it breaks into 2 pieces. This is Round 2.

This process continues.

How many pieces of clay will there be after Round 8?



Show and Share

Describe the strategy you used to solve the problem.

Connect

Suppose a cow produces her first female calf when she is 2 years of age.

After that, she produces a female calf each year.

Suppose each cow produces her first female calf when she is 2 years of age and no cows die.

How many cows will there be after 5 years?

Strategies

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



What do you know?

- Each cow produces a female calf at age 2.
- Every year after that, she produces 1 female calf.
- No cows die.









Think of a strategy to help you solve the problem.

- You can **draw a diagram**.
- Find out how many cows there are after 1 year, then after 2 years, and so on.



Copy and continue the diagram.

1 cow			Start
1 cow			After 1 year
2 cows			After 2 years
3 cows			After 3 years

After 1 year, there is 1 cow.
 After 2 years, there are 2 cows.
 After 3 years, there are 3 cows.
 How many cows are there after 5 years?



Check your work.

What pattern do you see in the numbers of cows?

Practice

Choose one of the

Strategies

1. A mouse crawls through this maze.

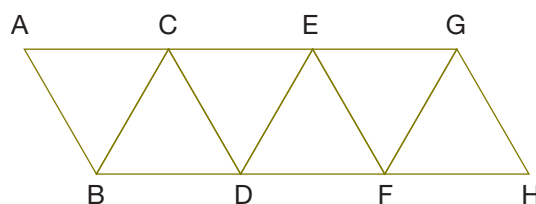
The mouse always moves forward.

- a) How many different paths could the mouse take from A to B?

From A to C? From A to D?

What pattern do you see?

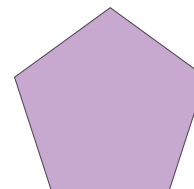
- b) Predict the number of different paths the mouse could take from A to H.



2. Here is a regular pentagon. Copy the pentagon.

Join each vertex to all other vertices.

How many different triangles are there?



Reflect

How does drawing a diagram help to solve a problem?

Use words, pictures, and numbers to explain.

5

Using a Variable to Write an Equation

Which statements below are equations?

How do you know?

$3 + 7 = 10$ $3 + 7 + 10$ $12 = 14 - 2$ $12 - 2 + 14$ $5 - 1 = 2 + 2$

How would you say each equation without using these words:

“plus,” “add,” “minus,” or “take away”?

Explore



You will need index cards and scissors.

- Create 4 game cards, each one similar to one of the cards below. Use one of $+$, $-$, \times , or \div in each equation.

Eight is three more than a number.	$8 = \square + 3$
Two less than a number is nine.	$\nabla - 2 = 9$
Four times a number is twenty.	$4 \times \diamond = 20$
Five is thirty divided by a number.	$5 = 30 \div *$

- Cut the cards in half, then shuffle them. Trade your cards with those of another pair of classmates. Match each sentence to its equation.

Show and Share

What strategies did you use to write the equations?

How did you decide which symbol to use?

What strategies did you use to match the cards?

For each sentence, how could you write the equation a different way?

We may be able to write an equation to help us solve a problem.
We use a letter variable to represent what we do not know.

- Jean-Luc opened a package of 20 pencils.
He gave out some pencils.
There were 6 pencils left.
How many pencils did Jean-Luc give out?

We use a variable to represent
the number of pencils given out.
Let p represent the number of pencils given out.
Here are 3 equations we can write.

- We know that:
Total number of pencils = number given out + number left
One equation is: $20 = p + 6$
- We know that:
Number left = total number of pencils – number given out
A second equation is: $6 = 20 - p$
- We know that:
Number given out = total number of pencils – number left
A third equation is: $p = 20 - 6$

The variable we choose is often the first letter of a word in the problem.



- Marie had 36 e-mails in her inbox.
This was twice as many e-mails as she had last week.
How many e-mails did Marie have last week?

Let e represent the number of e-mails Marie had last week.
Here are 2 equations we can write.

- We know that:
 $2 \times$ number of e-mails last week = number of e-mails this week
One equation is: $2 \times e = 36$
Or, $2e = 36$
- We know that:
Number of e-mails last week = number of e-mails this week $\div 2$
A second equation is: $e = 36 \div 2$

We write $2 \times e$ as $2e$:
that is, we do not write the multiply sign.

Practice

1. Which equation below represents this problem? Explain your choice.

Together, Melissa and Pierre have 15 rare hockey cards.

Melissa has 9 cards.

How many cards does Pierre have?

- a) $c = 15 + 9$ b) $15 = c + 9$ c) $9 = 15 + c$ d) $c - 15 = 9$

Write an equation for each of questions 2 to 4.

2. Mary-George has 4 buckets of clams for the Long House feast.
Each bucket contains the same number of clams.
Altogether, Mary-George has 120 clams.
How many clams are in each bucket?



3. Lesley read 114 pages of an exciting novel.
The novel is 204 pages.
How many more pages does Lesley have to read?
4. The water cooler held 66 cups of water.
Each minute, 3 cups of water were taken.
How many minutes did it take for the water cooler to empty?

Write 2 equations for each of questions 5 and 6.

5. Three towers were built. Each tower had the same number of toy blocks.
Altogether, there were 144 blocks.
How many blocks were in each tower?
6. Jaipreet picked 30 boxes of blueberries in the bush.
After she sold some boxes, she had 13 boxes left.
How many boxes did Jaipreet sell?



7. Write a word problem for which you can write an equation.
Write as many equations as you can for your problem.
Explain how you know each equation represents the problem.

Reflect

Look at the questions above.

Explain how you decided whether to use $+$, $-$, \times , or \div in an equation.

6

Solving Equations Involving Addition and Subtraction

How many counters are in the bag?

How do you know?



Explore



- Solve this problem:
Rui has \$35.
After he spent some money, Rui had \$19 left.
How much money did Rui spend?
- How many different ways can you solve the problem?
Describe each strategy you used.

Show and Share

Share your strategies and solution with another pair of classmates.

If you wrote an equation, did you write the same equation?

If not, is one equation incorrect? Explain.

If you did not write an equation, work together now to write and solve an equation to solve the problem.

Connect

Wendy washed 72 windows in an apartment building.

She had 98 windows to wash altogether.

How many more windows has Wendy to wash?

Write an equation to solve this problem.

Let w represent the number of windows Wendy has still to wash.

We know that:

Total number of windows = windows already washed + windows still to be washed

One equation is:

$$98 = 72 + w$$



Here are two ways to solve this equation.

- Guess and test

$$98 = 72 + w$$

Guess a number for w , then test to see if you are correct.

Guess: $w = 10$

Test: $72 + 10 = 82$ This is too low.

Guess: $w = 20$

Test: $72 + 20 = 92$ This is too low, but closer to the number we want.

Guess: $w = 25$

Test: $72 + 25 = 97$ This is very close.

$w = 26$ is the **solution** to the equation.

Guess: $w = 26$

Test: $72 + 26 = 98$

So, $w = 26$

- **By inspection**

$$98 = 72 + w$$

Which number do we add to 72 to get 98?

We subtract to find out.

The number we add is: $98 - 72 = 26$

So, $w = 26$

Wendy has 26 more windows to wash.

By *inspection* means I look at, or *inspect*, the equation to try to figure out the number that w represents.



Practice

1. Solve each equation.

Which strategy will you use?

a) $20 = c + 1$

b) $c + 2 = 20$

c) $3 + c = 20$

d) $20 = 4 + c$

2. Solve each equation.

Which strategy will you use?

a) $10 = n - 1$

b) $n - 2 = 10$

c) $10 - n = 3$

d) $4 = 10 - n$

For each of questions 3 to 7, write an equation.
Solve the equation to solve the problem.

3. Scott and Jamie have a collection of autographed pictures.
Altogether, they have 36 pictures.
Scott has 13 pictures.
How many pictures does Jamie have?
4. The girls' field hockey team has 32 jerseys.
Some of these jerseys are new. Nineteen jerseys are from last year.
How many jerseys are new?
5. Mandeep buys a case of 24 cans of juice.
In one week, Mandeep drinks 11 cans.
How many cans are left?
6. Sholeh wants to add 40 files to a folder in her laptop computer.
There is only enough room for 13 files. Sholeh cannot delete any files.
How many files will not fit?
7. A ribbon is 45 cm long. Adam cuts off a piece.
The ribbon that is left is 12 cm long.
How long was the piece Adam cut off?
8. For each equation, write a story problem that could be solved by using the equation.

a) $30 = a + 5$ **b)** $b - 4 = 25$ **c)** $40 - c = 16$ **d)** $35 = d - 11$



9. **a)** Write as many different equations as you can for this problem:
Sandra and Kirk have 72 linking cubes.
Kirk has 28 cubes.
How many cubes does Sandra have?
b) Solve each equation you wrote in part a.
c) Solve the problem in part a.
Show your work.



Reflect

Which method for solving an equation do you find easiest?
Explain your choice.

Solving Equations Involving Multiplication and Division

Explore



- Solve this problem:
For a school fund-raiser, Yettis is packing boxes for children in Guyana, South America.
Yettis has 48 notebooks.
She puts 6 notebooks in each box.
How many boxes will have notebooks?
- How many different equations can you write to solve the problem?
List each equation.

Show and Share

Share your equations and solution with another pair of classmates.
What types of equations did you write?
What strategies did you use to solve your equations?



Connect

Clive watched the first snow of the season fall outside his window.
Each hour, 3 cm of snow fell.
The total snowfall was 15 cm.
For how many hours did it snow?

Write an equation to solve this problem.
Let t represent the number of hours it snowed.
Here are 3 equations we can write and solve.

- Using multiplication

We know that:

Total snowfall = snow that falls in 1 h \times number of hours it snowed

One equation is:

$$15 = 3 \times t$$

Or, $15 = 3t$



$3t$ is a short way to write $3 \times t$.

To solve this equation, think:

Which number do we multiply 3 by to get 15?

We know that: $3 \times 5 = 15$

So, $t = 5$

► Using division

- We know that:

Number of hours it snowed = total snowfall \div snow that falls in 1 h

One equation is:

$$t = 15 \div 3$$

So, $t = 5$

- We also know that:

Snow that falls in 1 h = total snowfall \div number of hours it snowed

Another equation is:

$$3 = 15 \div t$$

To solve this equation, think:

Which number do we divide 15 by to get 3?

We know that: $15 \div 5 = 3$

So, $t = 5$

The snow fell for 5 h.

Practice

1. Solve each equation.

a) $2 \times m = 4$

b) $2 \times m = 6$

c) $2 \times m = 8$

d) $2 \times m = 10$

e) $3 \times m = 18$

f) $3 \times m = 21$

g) $3 \times m = 24$

h) $3 \times m = 27$

2. Solve each equation.

a) $20 = 5c$

b) $2c = 30$

c) $4c = 44$

d) $50 = 5c$

e) $6c = 42$

f) $56 = 7c$

g) $8c = 64$

h) $54 = 9c$

3. Solve each equation.

a) $n = 16 \div 2$

b) $30 \div n = 10$

c) $8 = 48 \div n$

d) $5 = n \div 6$

e) $25 \div n = 5$

f) $6 = 42 \div n$

g) $n = 72 \div 8$

h) $n \div 4 = 8$

4. Solve each equation.

a) $63 \div r = 7$

b) $21 = 7s$

c) $t \div 5 = 7$

d) $36 = 4u$

e) $49 \div 7 = v$

f) $5w = 45$

g) $8 = 40 \div z$

h) $8n = 80$

For each of questions 5 to 9, write an equation.
Solve the equation to solve the problem.

5. For a traditional burning ceremony, Cam had 22 bundles of cedar logs.
Each bundle contained 3 logs.
How many logs did Cam have altogether?

6. Holly made a comic book with 8 pages.
She had several copies of the book printed.
Holly paid for 96 pages altogether.
How many comic books did she print?

7. Starkley used his computer to write and record a drum track.
Each bar of the song had 4 beats.
The printout showed 31 bars of music.
How many beats did Starkley record?



8. Kimberly left Edmonton for a long car trip.
She travelled 400 km in 5 h.
About how far did Kimberly travel in 1 h?

9. Teagan picked cranberries for one week.
Each day, he picked 30 baskets of cranberries.
How many baskets did Teagan pick in 7 days?

10. For each equation, write a story problem that could be solved by using the equation.

a) $45 = 5n$

b) $77 \div 7 = r$

c) $6 = 24 \div s$

d) $t \div 7 = 8$

11. a) Write an equation.

b) Write a story problem that could be solved by solving the equation.

c) Solve the equation and the problem.

d) What other equations could you write to solve the story problem?
Show your work.



Reflect

When you have a problem that can be solved by dividing, why can you write at least two equations for the problem? Use an example to explain.

Match It!



Your teacher will give you copies of Equation Cards and Problem Cards.

You will need scissors.

The goal of the game is to match each Equation Card to a Problem Card, and explain why the match was made.

- Cut out the cards.
Shuffle the cards.
Place all the cards face up in an array.
- Take turns to pick two matching cards.
Explain how you know the match is correct.
If the match is not correct, the player returns the cards to the array, and awaits his next turn.
- One point is awarded for the correct match.
One point is awarded for a clear explanation.
A bonus point is awarded for solving the equation and the problem.
- Play until all the cards have been matched, or until a player has 10 points.



LESSON

1

1. Write the first 6 terms of each pattern.
 - a) Start at 100. Subtract 6 each time.
 - b) Start at 10. Alternately, add 5 then subtract 2.
2. For each pattern below:
 - Use counters to show the first 3 terms.
 - Predict the 6th and 7th terms.
 - Use counters to check your predictions.
 - Describe the pattern.How is each term different from the term before?
 - Write a pattern rule.

a) 2, 4, 6, 8, 10, ...

b) 2, 4, 7, 11, 16, ...

c) 2, 4, 5, 7, 8, ...

2

3. For each pattern below, choose the number that is the next term in the pattern. Explain your choice.
 - a) 5, 8, 12, 15, 19, ...
Which number is the next term: 20, 21, 22, 23, or 24?
 - b) 50, 48, 47, 45, 44, ...
Which number is the next term: 43, 42, 41, 40, or 39?
 - c) 10, 12, 16, 22, 30, ...
Which number is the next term: 34, 36, 38, 40, or 42?
4. A magazine costs \$4.00.
 - a) What is the cost of 2 magazines? 3 magazines? 4 magazines?
5 magazines? 6 magazines?
Show your answers in a table.
 - b) How much would 98 magazines cost?
 - c) How many magazines can you buy with \$100?
 - d) Suppose you have \$50.00.
Can you buy magazines and have no money left over?
How do you know?

3

5. Use a variable to write a pattern rule for each number pattern. Find the 50th term in each pattern.
 - a) 4, 5, 6, 7, 8, ...
 - b) 12, 13, 14, 15, 16, ...

LESSON

3

6. For each hour Riley does chores, her mother increases her earnings by \$1 per hour.

This table shows Riley's earnings per hour for the first 3 hours.

Hours Worked	Money Earned per Hour
1	\$3
2	\$4
3	\$5



- a) Copy the table.
Extend the table 3 more rows.
- b) Use a variable to write an expression for the money earned per hour.
- c) Suppose this pattern continues.
How much would Riley earn for the 10th hour she works?

For each of questions 7 to 9, write an equation for the problem, then use the equation to solve the problem.

5
6
7

7. Adala runs 5 km each day.
How far does Adala run in 17 days?
8. Joe is collecting cans of food for the food bank.
On Monday, he had 27 cans.
On Tuesday, he had 53 cans.
How many more cans did Joe have on Tuesday than on Monday?
9. Suri has 75 stickers.
She shares the stickers among her friends.
Each friend has 15 stickers.
How many friends received stickers?
10. For each equation, write a story problem that could be solved by using the equation.
- a) $36 = 4n$ b) $4 + n = 36$
c) $36 = n - 4$ d) $n \div 4 = 36$

UNIT

1

Learning Goals

- ☒ use a pattern rule to describe a pattern
- ☒ make predictions about terms in a pattern
- ☒ use a variable to describe a pattern
- ☒ use a variable to write equations
- ☒ solve equations to solve problems

Unit Problem

Charity Fund-raising



Plan an event to raise money for charity.

Include:

- a description of the event
- how much you estimate the costs will be
- how much money you expect to raise
- tables to show any patterns in the money you expect to raise
- a poster to promote your fund-raising event

Check List

Your work should show

- ☒ a detailed plan of the event
- ☒ how you calculate the amount you expect to raise
- ☒ any tables and patterns you used
- ☒ correct math language



Reflect on Your Learning

Write about some of the different equations in the unit, and how you used them to solve problems.