Get Ready

Name: _____ Date: _____

Order of Operations

In math, the order of operations is
- work in brackets first
- if there are multiple brackets, do the inside ones first
- multiply or divide in order from left to right
- add or subtract in order from left to right

You used the order of operations in Chapter 2.

For example,

$3 + 5 \times 6 \div 2$	Multiply or divide from left to right.	$(3 + 5) \times 6 - 2$	Brackets.
$= 3 + 30 \div 2$		$= 8 \times 6 - 2$	Multiply or divide from left to right.
$= 3 + 15$	Add or subtract from left to right.	$= 48 - 2$	Add or subtract from left to right.
$= 18$		$= 46$	

1. Evaluate.

a) $8 + 3 \times 2 - 6$

b) $(1.4 + 3.1) \times 2 \div 3$

2. What is the missing number?

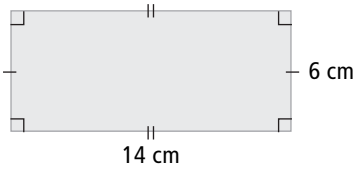
a) $\square + 3 \times 25 = 125$

b) $8.2 - \square \div 2 = 2.6$

Work With Formulas

When you work with a formula, substitute what you know, and evaluate using the order of operations.

Calculate the perimeter and the area of this rectangle.



The formula for perimeter of a rectangle is $P = 2(l + w)$.
$P = 2(l + w)$
$P = 2(14 + 6)$
$P = 2(20)$
$P = 40$

The perimeter of the rectangle is 40 cm.

The formula for area of a rectangle is $A = l \times w$.
$A = l \times w$
$A = 14 \times 6$
$A = 84$

The area of the rectangle is 84 cm^2.

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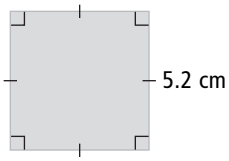
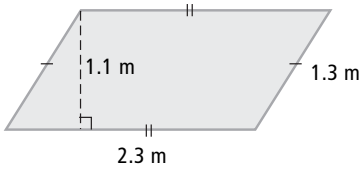
3. What are the perimeter and area of a square with sides of 5.2 cm? Show your work.



4. What are the perimeter and area of this parallelogram? Show your work.



Area of a parallelogram = $b \times h$.

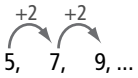
5. If the height of the parallelogram in #4 is unchanged and the area is 3.5 m^2, what is the new length of the base?

Identify and Extend Patterns

When you work with a number pattern, ask yourself two questions:

- What number starts the pattern?
- How do the values change from one item to the next?

Look at the pattern



The pattern starts at 5.
The numbers change by adding 2 each time.

You can describe this number pattern as follows:

$5 = 5$
$7 = 5 + 2$
$9 = 5 + 2 + 2$

The next two numbers are 11 and 13.

Can you think of another way to describe this number pattern?

6. Describe each number pattern. Identify the next two numbers in each pattern.

a) 4, 8, 12, …

b) 24, 20, 16, …

7. Complete each number pattern.

a) 3, 6, 9, ☐, ☐, ☐

b) 24, 18, 12, ☐, ☐, ☐

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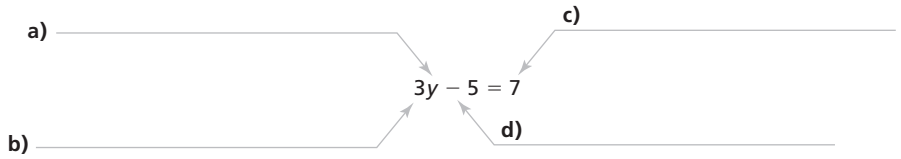
11.1 Expressions and Equations

***MathLinks 7*, pp. 390–394**

Key Ideas Review

1. Use the words below to label the parts of this example, then complete the sentence.

constant | equation | numerical coefficient | operation | variable

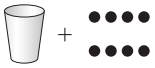


e) This is an example of a(n) _____.

2. Identify what your variable stands for. Draw an example for $x - 4$.

Practise and Apply

3. Identify and write each model as an expression or an equation.

a) 

b) 

4. Identify the numerical coefficients, variables, and constants in each expression or equation in #3.

a) numerical coefficient(s): _____

variable(s): _____

constant(s): _____

b) numerical coefficient(s): _____

variable(s): _____

constant(s): _____

5. Model each phrase using cups and counters. Write each phrase as an expression or an equation.

a) a number plus three

b) two times a number plus four equals twelve

c) thirteen equals seven plus three times a number

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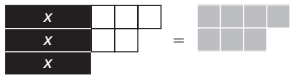
6. For each expression or equation in #5, circle the numerical coefficient, highlight the variable, and underline the constant(s).

7. Write the two expressions that make up each equation. Write the equation. Grey tiles represent +1, and white tiles represent –1.

a) 

b) 

8. Write the two expressions that make up each equation. Write the equation.

a) 

b) 

9. Write an expression for each phrase.

a) seven kilograms more than Victoria's mass

b) the product of w and nine is increased by eight

10. Write an equation for each phrase.

a) twice today's temperature minus four degrees equals eight degrees

b) three times your age minus ten years equals twenty-six years

c) your height in centimeters divided by five equals thirty-two centimeters

11. Write a word phrase to represent each expression.

a) $4h + 5$

b) $3(a - 10)$

c) $9 + 5t$

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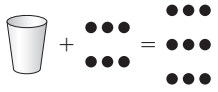
11.2 Solve One-Step Equations: $x + a = b$

***MathLinks 7*, pp. 395–401**

Key Ideas Review

Draw a line to connect each phrase in column A with the right example from column B.

A	B
1. Solve by inspection, using mental math.	**a)** Left side = 3 + 6 = 9 Right Side = 9 Left side = Right Side
2. Model the equation to help balance it.	**b)** $d + 6 = 9$ $d = 3$
3. Isolate the variable by performing the opposite operation on both sides of the equal sign.	**c)** 
4. To check your solution, substitute your answer into the equation. The solution is correct if the left side of the equation is equal to the right side.	**d)** $d + 6 \boxed{-6} = 9 \boxed{-6}$ $d + 6 = 9$ $d = 3$

Practise and Apply

5. Use mental math to solve each equation. Write the variable and its value. Show your thought process.

a) $b + 5 = 8$

b) $y - 6 = 10$

c) $12 = g + 7$

d) $m - 3 = 9$

6. Solve by inspection.

a) $c - 8 = 11$

b) $f + 9 = 12$

c) $17 = d + 12$

d) $9 = p - 15$

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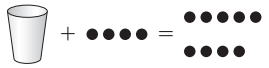
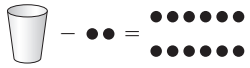
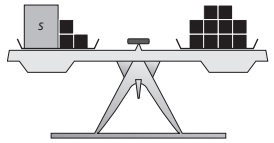
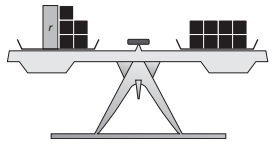
7. What is the number of counters needed in each cup to make each equation true?

a) 

b) 

8. What value must the variable have in each model to keep the scale balanced? Show your thinking.

a) 

b) 

9. Solve each equation using the opposite operation. Show your work. Check your answer.

a) $s + 5 = 10$

b) $y - 6 = -3$

c) $t + 8 = 14$

d) $14 = b - 10$

10. a) Draw a balance to show the equation $7 + d = 12$, if d represents an unknown mass.

b) What total mass should be on each side?

c) Solve the equation using the opposite operation. Show your work.

11. The average precipitation in Vancouver in January is 224 mm. This is 201 mm more than the average precipitation in Edmonton.

a) Write an equation that could be used to find the average precipitation in Edmonton, e, for January.

b) What is Edmonton's average January rainfall? Show your thinking.

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11.3 Solve One-Step Equations: $ax = b$, $\frac{x}{a} = b$

***MathLinks 7*, pp. 402–407**

Key Ideas Review

Unscramble the words to complete the sentences below.

1. Equations can be solved in several ways.

a) Solve by inspection, using _____ (AELMNT) math.

b) Model the equation to help _____ (AABCELN) it.

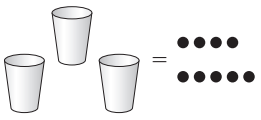
c) Isolate the _____ (AABEILRV) by performing the opposite _____ (AEINOOPRT) on both sides of the equal sign.

2. To check your solution, substitute your _____ (AENRSW) into the equation. The solution is correct if the _____ (EFLT) side of the equation is _____ (AELQU) to the right side.

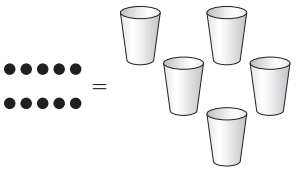
Practise and Apply

3. Solve using mental math. How many counters will be in each cup?

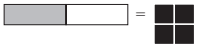
a)



b)



4. Use mental math to solve.



5. Solve by inspection.

a) $3x = 15$

b) $8g = 64$

6. Solve by inspection.

a) $\frac{y}{2} = 5$

b) $7 = \frac{d}{5}$

7. By what number would you divide both sides of each equation to solve it?

a) $6e = 36$

b) $5k = 40$

8. Solve using the opposite operation.

$3x = 21$

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9. Jessica paid $24 for 6 cans of tennis balls. Solve the equation $6c = 24$ to find the cost for each can of tennis balls. Check your answer.

10. By what number would you multiply both sides of the equation to solve it?

a) $8 = \frac{x}{7}$

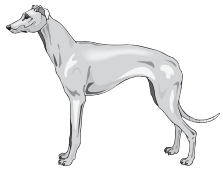
b) $21 = \frac{j}{5}$

11. Solve each equation using the opposite operation. Check your work.

a) $\frac{d}{5} = 12$

b) $3 = \frac{s}{14}$

12. A squirrel can run about one third the speed of a Whippet dog. If a squirrel can run 20 km/h, how fast can a Whippet run? Check your answer.



13. Show whether or not $x = 6$ is the solution to each equation.

a) $6x = 36$

b) $7x = 49$

14. Show whether or not $a = 10$ is the solution to each equation.

a) $\frac{a}{10} = 100$

b) $\frac{a}{2} = 5$

15. Merlin's height is three times his sister's height. Merlin is 207 cm tall. How tall is Merlin's sister? Show your work.

16. Ron needs to cook rice for a recipe. The instructions on the bag of rice say to use 2 c of water for every cup of rice.

a) Write an equation to model this situation.

b) The recipe he is making calls for 3 c of uncooked rice. How much water should he add? Show your thinking.

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11.4 Solve Two-Step Equations: $ax + b = c$

***MathLinks 7*, pp. 408–413**

Key Ideas Review

Use these equations to answer the following questions.

$2x = 4$ $y = 7$ $10 = 3a + 1$ $12 = r$ $\frac{r}{8} - 10 = 22$ $b + 9 = 3$ $7 = x - 1$

1. Circle the equations with isolated variables.

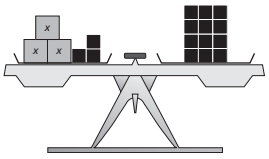
2. **a)** Underline the two-step equations.

b) Copy one of the two-step equations below and show the steps needed to isolate the variable.

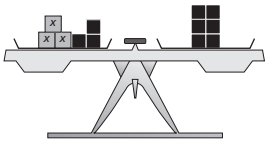
Practise and Apply

3. Solve the equation modeled by each diagram. Check your solution.

a)



b)



4. Model and solve each equation. Check your answer.

a) $4p + 2 = 10$

b) $7 = 3r - 8$

5. What operation do you do first to solve each equation?

a) $7x + 4 = 18$

b) $8s - 10 = 54$

c) $17 = 6y - 7$

d) $33 = 6 + 3h$

6. What operation do you do second for each of the equations in #5?

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7. Solve each equation using the reverse order of operation. Check your answer.

a) $4y - 7 = 37$

b) $6m + 13 = 55$

c) $78 = 15a - 12$

d) $131 = 11 + 6w$

8. Show whether or not $x = 5$ is the solution to each equation.

a) $8x + 8 = 48$

b) $5x - 2 = 25$

9. Trina's cell phone plan charges 25¢ per call plus 8¢ per minute. The cost per call can be modeled using the equation $C = 8t + 25$.

a) What do the variables C and t represent?

b) If Trina talks for 3 min, how much will the call cost? Show your thinking.

10. Indra rents a mountain bike. The rate is $12 plus $3 for each hour rented.

a) Write an equation to model the situation.

b) Indra has $27 to spend on the bike rental. How many hours will that pay for?

11. Jaxon's age is 7 years less than twice Oriand's age. Jaxon is 15 years old. How old is Oriand? Show your work.

12. You receive a coupon for Marine World. You pay $49 for two Day passes and two T-shirts.

COUPON
Buy two Day Passes. Get a T-shirt for $4.50.

a) What equation models this situation.

b) What is the cost of one day pass?

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Link It Together

Brian is writing a business plan for the day camp he will run this summer. Answer the questions below to help him complete the plan.

1. Brian uses the following data to calculate how much space to rent:

- Each camper needs 3 m^2 of room to play.
- The desk area will take up 1 m^2.
- The lunch area will take up 7 m^2.

a) Write an equation to help Brian calculate the space he needs.

b) Model the equation to help explain it to Brian. Identify what each variable stands for.

c) There is a 53 m^2 space for rent at the library. According to the equation, how many campers could fit into this space?

2. Each counsellor can be in charge of up to five campers. Brian will be one counsellor.

a) Write an equation to model the number of counsellors Brian should hire. Identify what each variable stands for.

b) Use your answer from #1c) to calculate how many counsellors Brian will need to hire if he has the maximum number of campers in the library space.

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Vocabulary Link

Use the clues to identify the important terms used in Chapter 11. Then, write them in the crossword puzzle.

Down

1. $-$ and $+$, $\times$ and $\div$

3. $21 = 5 + b$

5. $3b + 2$
↑
?

Across

2. $3y + 2$

4. $5x = 20$
↑
?

6. $\frac{24}{m} = 6$
↖
?

7. a number minus eight =  $-$