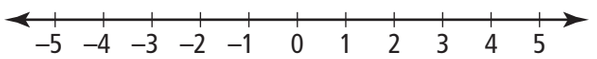
Get Ready

Name: _____ Date: _____

Represent Quantities With Integers

Integers include positive and negative whole numbers and zero.

An integer is any of the numbers $-3, -2, -1, 0, +1, +2, +3, \ldots$.



Integer chips are coloured disks that represent integers. A ⊕ represents $+1$; and ⊖ represents -1.

- If you climb 5 steps, this amount can be represented by the integer $+5$.
- If you descend 10 steps, this amount can be represented by the integer -10.

1. Use an integer to represent each quantity. Explain your reasoning.

a) an increase of 3%

b) 20 m below sea level

2. Suppose you win a prize of $15. Use an integer to describe what happens

a) from your point of view

b) from the point of view of the person giving the prize

Adding Integers

A **zero pair** includes one ⊕ and one ⊖.
A zero pair represents zero.
Integer addition can be modelled using integer chips or diagrams.


zero pair

3. Use the diagram to complete each addition statement.

a) ⊕⊕⊕⊕⊕⊕⊕
⊖⊖⊖⊖

$(+7) + (-4) =$ _____

b) ⊖⊖⊖⊖⊖⊖⊖⊖
⊕⊕⊕

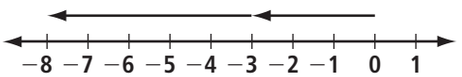
$(-8) + (+3) =$ _____

c) ⊕ ⊕ ⊕ ⊕
⊖

$(+4) + (-1) =$ _____

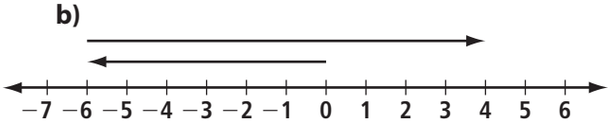
4. Use the diagram to complete each addition statement.

a)



$(-3) + (-5) =$ _____

b)



$(-6) + (+10) =$ _____

5. Complete each addition statement.

a) $(+4) + (+5) =$ _____

b) $(-7) + (-7) =$ _____

c) $(+6) + (-9) =$ _____

d) $(-2) + (+8) =$ _____

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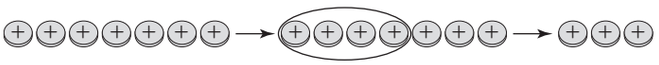
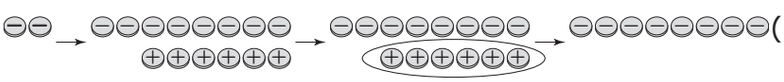
Subtracting Integers

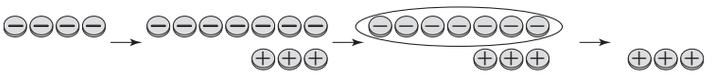
Integer subtraction can be modelled using integer chips or diagrams.
Any integer subtraction can be completed by adding the opposite integer.
$(+5) - (-4) = (+5) + (+4)$
$= +9$

6. Use the diagrams to complete the subtraction statements.

a)  $(+7) - (+4) =$ _____

b)  $(-6) - (-2) =$ _____

c)  $(-2) - (+6) =$ _____

d)  $(-4) - (-7) =$ _____

Order of Operations

The correct sequence of steps for a calculation follows the **order of operations** shown.

$8 \div 4 + (3 + 2) \times 6 - 7$	Do brackets first.
$= 8 \div 4 + 5 \times 6 - 7$	Multiply and divide from left to right.
$= 2 + 30 - 7$	Add and subtract from left to right.
$= 25$	

7. Calculate. Show your thinking.

a) $8 + 6 \times 5 - 1$

b) $3 \times (7 - 2) + 16 \div 4$

c) $24 \div 6 + 18 \div 2$

d) $(4 + 2) \div 6 + 6 \times 3 - 4$

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8.1 Exploring Integer Multiplication

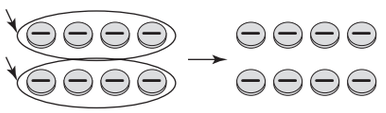
***MathLinks 8*, pages 286–292**

Key Ideas Review

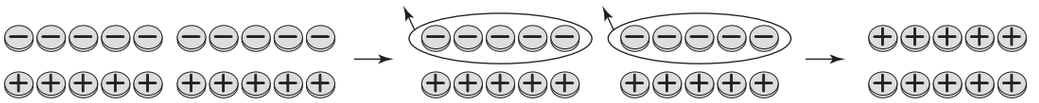
Choose from the terms below to complete #1.

insert	integer	negative	positive	zero

1. a) To model the multiplication of an integer by a _____ integer, you can _____ the appropriate integer chips. For example, $(+2) \times (-4) = -8$



b) To model the multiplication of an integer by a _____ integer, you can remove the appropriate integer chips from _____ pairs. For example, $(-2) \times (-5) = +10$



Practise and Apply

2. Write each repeated addition as a multiplication.

a) $(+5) + (+5) + (+5) + (+5)$

b) $(-7) + (-7) + (-7)$

c) $(-3) + (-3) + (-3) + (-3) + (-3)$

d) $(+2) + (+2) + (+2)$

3. Write each expression as a repeated addition.

a) $(+4) \times (+1)$

b) $(+3) \times (-6)$

c) $(+5) \times (-2)$

d) $(+2) \times (+9)$

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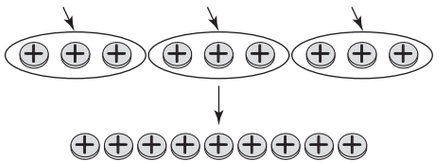
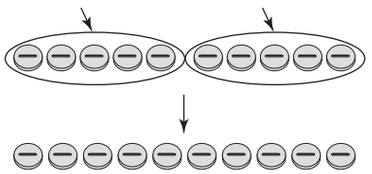
4. What multiplication statement does each set of diagrams represent?

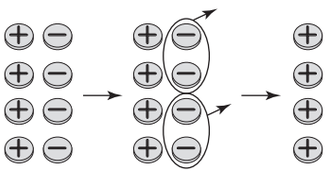
a)



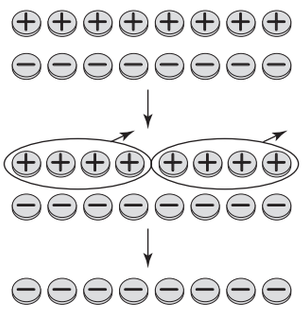
b)



c)



d)



5. Complete each multiplication statement. Show your thinking.

a) $(+2) \times (+8)$

b) $(+4) \times (-3)$

c) $(-1) \times (+8)$

d) $(-3) \times (-5)$

6. Use the multiplication of two integers to represent each situation. Then, determine the product and explain its meaning.

a) Serena mows her neighbour's lawn once a week. If she gets paid $6.00 each time, how much does she earn over eight weeks?

b) The temperature dropped 3 °C per hour. What was the total drop in temperature at the end of 12 hours?

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8.2 Multiplying Integers

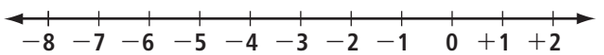
***MathLinks 8*, pages 293–299**

Key Ideas Review

Choose from the terms below to complete #1 to #3. Then, complete the examples.

negative	number line	positive	same	sign

1. You can use a _____ to model multiplication of a _____ integer by another integer.
For example, $(+4) \times (-1) = -4$ can be modelled as



2. a) You can multiply two integers by multiplying the numerals and applying the _____ rules below.

b) If both integers have the same sign, then the product is _____.
For example, $(-7) \times (-4) =$ _____ and $(+7) \times (+4) =$ _____

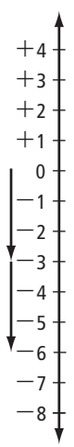
c) If the integers have different signs, then the product is _____.
For example, $(-7) \times (+4) =$ _____ and $(+7) \times (-4) =$ _____

3. It does not matter in what order you multiply 2 integers. You will get the _____ answer. For example, $(+4) \times (-6) = -24$ or $(-6) \times (+4) =$ _____

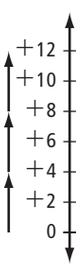
Practise and Apply

4. Write the multiplication statement shown on each diagram.

a)



b)



5. Draw a number line to determine each product.

a) $(+2) \times (-5)$

b) $(+4) \times (+4)$

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6. Determine each product using the sign rules.

a) $(+7) \times (+6)$

b) $(+8) \times (-4)$

c) $(-5) \times (+9)$

d) $(-10) \times (-11)$

7. Estimate and then calculate.

a) $(+18) \times (+9)$

b) $(+32) \times (-15)$

c) $(-59) \times (+12)$

d) $(-98) \times (-18)$

8. Joshua spilled juice on his assignment. Fill in the integers that got smudged.

a) $(+10) \times (-4) =$ _____

b) $(-4) \times$ _____ $= -20$

c) _____ $\times (-8) = +16$

d) _____ $\times (-6) = -54$

e) $(+5) \times$ _____ $= +35$

9. An Internet provider offers a discount of $2.50 per month if a customer pays by automatic withdrawal.

a) How much will a customer save over two years?

b) How much will the Internet provider lose annually for each customer who makes this choice? Express this as an integer.

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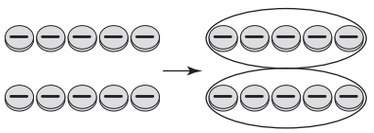
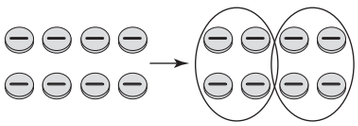
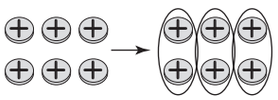
8.3 Exploring Integer Division

***MathLinks 8,* pages 300–305**

Key Ideas Review

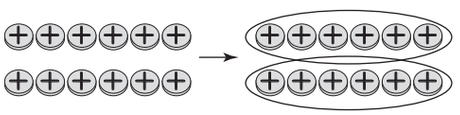
Draw a line from the model in Column A to the matching integer division statement in Column B.

A	B
1. 	**a)** $(-8) \div (-4) = +2$
2. 	**b)** $(+6) \div (+2) = +3$
3. 	**c)** $(-10) \div (+2) = -5$

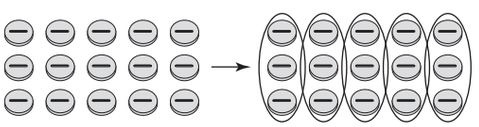
Practise and Apply

4. Use the diagrams to complete each division statement.

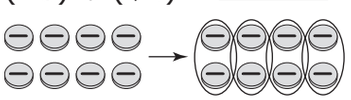
a) $(+12) \div (+6) =$ _____



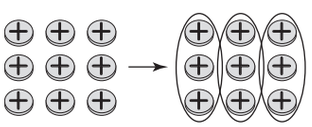
b) $(-15) \div (-3) =$ _____



c) $(-8) \div (+4) =$ _____



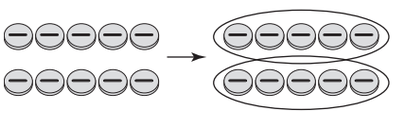
d) $(+9) \div (+3) =$ _____



5. Use the diagram below each question to solve both statements.

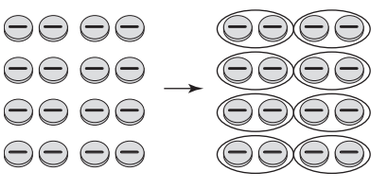
a) $(-10) \div (+2) =$ _____

$(-10) \div (-5) =$ _____



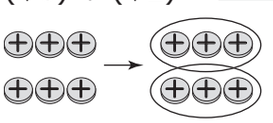
b) $(-16) \div (-2) =$ _____

$(-16) \div (+8) =$ _____



c) $(+6) \div (+3) =$ _____

$(+6) \div (+2) =$ _____



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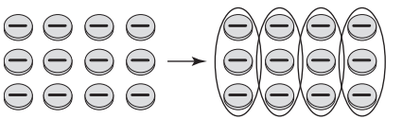
6. Use the diagram to solve both statements.

$(-12) \div (+4) =$ _____

$(-12) \div (-3) =$ _____



7. Draw a diagram to solve each question.

a) $(-14) \div (-7) =$ _____

b) $(+18) \div (+9) =$ _____

8. Examine this pattern.

$(-20) \div (-5) =$ _____

$(-15) \div (-5) =$ _____

$(-10) \div (-5) =$ _____

$(-5) \div (-5) =$ _____

$0 \div (-5) =$ _____

$(+5) \div (-5) =$ _____

$(+10) \div (-5) =$ _____

a) Use integer chips to complete the first four lines. Describe the pattern.

_____

_____

_____

b) Extend the pattern to determine the quotient $(+10) \div (-5)$.

9. Use the division of two integers to represent each situation and solve the problem.

a) Marcus scored 18 points during three games at his basketball tournament this weekend. If he scored the same number of points in each game, how many did he score per game?

b) Kellie played four games of hockey this weekend. She was on the ice when her opponents scored 20 goals. Her stats receive a -1 each time. What are her stats for each game this weekend?

10. If the road's posted maximum speed is 100 km/h, how long will it take to drive 21 km? Use the division of two integers to represent this situation, then solve.

11. Penelope gets a pay cheque of $750 every two weeks. If she works Monday to Friday, how much is earned each day? Use the division of two integers to represent this situation, then solve.

Name: _____ **Date:** _____

8.4 Dividing Integers

***MathLinks 8,* pages 306–311**

Key Ideas Review

Choose from the following terms to complete #1 and #2.

negative	number line	numerals	positive	sign	some

1. You can model _____ integer divisions on a _____.

2. You can divide two integers by dividing the _____ and applying the _____ rules:

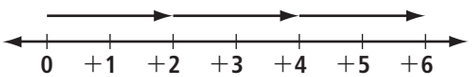
a) The quotient of two integers with the same sign is _____.

b) The quotient of two integers with different signs is _____.

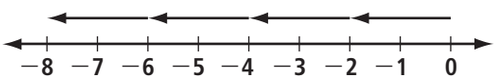
Practise and Apply

3. Write two division statements that each diagram could represent.

a)



b)



4. Draw a number line to find each quotient.

a) $(-9) \div (+3) =$ _____

b) $(+10) \div (+5) =$ _____

c) $(-12) \div (-6) =$ _____

d) $(-15) \div (+5) =$ _____

5. Find each quotient.

a) $(-22) \div (+2) =$ _____

b) $(+18) \div (-6) =$ _____

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6. Calculate and check.

a) $(-64) \div (-4) =$ _____

b) $(-52) \div (+52) =$ _____

c) $(+100) \div (-5) =$ _____

7. The product of two integers is $+286$. What is the other integer if one of them is -13? Show your thinking.

8. Tasha bought the same lunch at the school cafeteria every day last week. She spent a total of $15. How much did she spend each day? Show your thinking.

9. The new game system is out next week and Juan is short $60 to purchase one. He may borrow the rest of the money equally from his Mom, Dad, older sister, and aunt.

a) How much will Juan have to pay back to each person?

b) If Juan repays each person $5 a month, how many months will it take to pay off his debt?

10. Without calculating, circle the quotient with the highest value. Explain your reasoning.

$(-1972) \div (+35)$

$(-1972) \div (-35)$

$(+1972) \div (-35)$

11. A butterfly travels 6000 m in 30 min. How far does it travel per minute?

12. Danika is downloading a 1200 MB movie rental. The internet connection is running at 249 kB per second. How long will it take to get the movie? Show your thinking.
Hint: 1 MB = 1000 kB

Name: _____ **Date:** _____

8.5 Applying Integer Operations

***MathLinks 8,* pages 312–317**

Key Ideas Review

For #1 and #2, unscramble the letters to form a word that correctly completes the statement.

1. If you are solving a problem with integers, you need to decide which _____ (NETIPRAOO) to perform.

2. Some integer problems involve the _____ (REDOR) of _____ (SAPTOOREIN).

3. Put the statements in order according to the order of operations.

_____ Multiply and divide, from left to right.

_____ Add and subtract, from left to right.

_____ Brackets.

Practise and Apply

4. Calculate using the order of operations. Show your thinking.

a) $(+21) \div (-3) + (-2) \div (+1)$

b) $(-15) \div [(-3) \times (-1)] + (+2)$

c) $(-2) \times (-5) \div (-2) + (-7)$

d) $[(-3) + (-8)] + (-1) \times (-4)$

5. Calculate.

a) $(-7) + (-5) \times (+6) \div (-10)$

b) $(-3) - (-4) \times (-10) - (-12)$

6. The chart shows the change in the attendance at games night.

Week	1	2	3	4	5	6
Attendance	+12	−4	+6	−10	+15	+1

a) How many people were there the last week?

b) Create an integer statement to show the change in attendance from week 1 to week 6.

Name: _____ **Date:** _____

7. Zelia loses seven points every three minutes that she doesn't make it to the next level on the video game.

a) If she plays for 24 minutes without reaching the next level, how many points has she lost?

b) If she played for three hours this month and never made it to the next level, how many points did she lose?

c) If she lost 567 points, for how long did she play without reaching the next level?

8. The temperature change in the chicken egg incubator is recorded every hour (on a 24-h clock). The temperature at 8 a.m. was 35 °C.

Time	9	10	11	12	13	14	15	16
Temp(°C)	+2	+1	+1	−3	−1	+4	−1	−2

a) When was the temperature

highest? _____

When was it lowest? _____

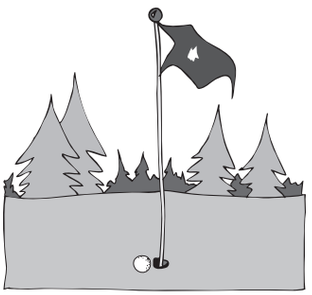
b) Write an integer statement to represent the mean temperature change over the period shown.

9. Par 3 means that an expert golfer would take three strokes to complete the hole. The score indicates how many more (+) or fewer (−) strokes the player took to complete the hole. This is Paco's scorecard.

Hole	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Par	3	3	3	3	3	3	3	3	3
Score	−1	+1	−2	Par	−2	+3	−1	+1	Par

a) How many strokes did Paco take to complete the nine holes? Write an integer statement to represent the score, then solve.

b) If his friend scored +1 on each hole, how many strokes did he take in total?



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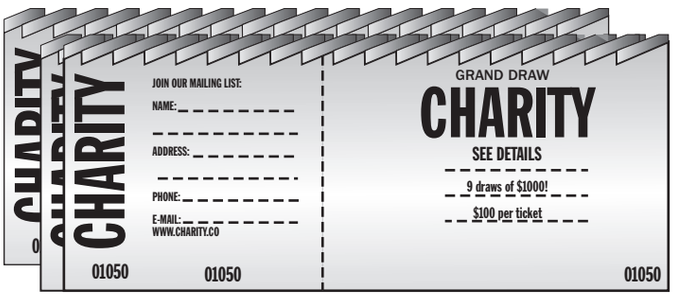
Link It Together

At a charity dinner, money was raised by selling draw tickets for $100 each. There were 290 tickets sold. Some of the money was then given away as nine draw prizes of $1000 each. Write an integer statement for each of the following scenarios, and then solve.



1. How much money remained for the charity after the prizes were awarded?

2. At Keeley's table there were seven other guests. Each person said they would share their winnings minus the price of the ticket equally with everyone else at the table. Keeley won one of the $1000 draws. How much did each person at the table receive from her winnings?

3. Keeley's Dad bought a table of tickets for his employees (seven tickets, plus one for himself). Two employees' tickets won. How much money did the table give to the charity? Explain.

Name: _____ **Date:** _____

Vocabulary Link

Use the clues to identify the key words from Chapter 8. Then, write them in the crossword puzzle blank.

Across

4. The second integer order of operation you perform is multiplying and dividing in _____ from left to right.

5. The third integer order of operation is adding and subtracting, in order, from _____ _____ _____.

Down

1. The _____ _____ include:

- the product or quotient of two integers with the same sign is positive
- the product or quotient of two integers with different signs is negative

2. What do you do first in the order of operations? _____.

3. This visual shows a(n) _____ _____.

6. Any of the numbers –2, –1, 0, +1, +2, … is a(n) _____.