Chapter 6 Review

Learning Goals

Inquire and Explore: How can you represent a discrete linear relationship?
What factors change a discrete linear relationship?
How can you model and solve equations?

After this section, I can	
6.1	■ distinguish between an expression and an equation ■ represent pictorial and written patterns with equations ■ describe contexts for given equations ■ solve problems that involve pictorial and written patterns using an equation ■ verify equations by substituting values
6.2	■ represent linear relations numerically, graphically, and algebraically, and connect these representations ■ model problems using linear relations, and solve them using graphs
6.3	■ model linear equations of the form $ax + b = c$ and $\frac{x}{a} + b = c$ ■ show how to solve linear equations of the form $ax + b = c$ and $\frac{x}{a} + b = c$
6.4	■ model problems that involve linear equations of the form $a(x + b) = c$ ■ show how to solve linear equations of the form $a(x + b) = c$

6.1 Representing Patterns, pages 178–187

1. a) Make a table of values for the toothpick pattern.

Figure 1 Figure 2 Figure 3

b) Describe the pattern.

c) Develop an expression relating the number of toothpicks to the figure number.

d) How many toothpicks are in Figure 10? Verify your answer.

e) How do the numerical values in the expression represent the pattern?

2. Derek has $1560 in his bank account. He plans to withdraw $15 every week for a year.

a) Create a table of values for his first five withdrawals.

b) What equation models this situation?

c) How much money will Derek have in his account after 35 weeks?

d) How long will it take until he has $870 left in his account?

3. Taylor works at a shoe store. She makes $75 per day plus $2 for every pair of shoes she sells.

a) Create a table of values to show how much she would earn for selling up to 10 pairs of shoes in one day.

b) Develop an equation to model this situation.

c) How much money will Taylor make in a day if she sells 12 pairs of shoes?

6.2 Graphing Linear Relations, pages 188–199

4. The equation $C = 40 + 20d$ models the cost of renting a snowboard, where C is the rental cost, in dollars, and d is the number of rental days.

a) What does the value of 40 represent?

b) Graph the linear relation for the first 5 days.

c) From the graph, what is the approximate cost of renting the snowboard for 1 day? 7 days?

d) If buying a snowboard costs $300, use your graph to approximate how many days you could rent a board before it becomes cheaper to buy it.

5. Graph the linear relation represented in the table of values.

Time (h)	Distance (km)
1	52
2	104
3	156
4	208
5	260
6	312

a) Describe a situation that might lead to these data.

b) Develop a linear equation to model the data.

c) What do the numerical coefficients and constants in the equation tell you?

6. A parking lot charges a flat rate of \$3 and \$2 for each hour or part of an hour of parking.

a) Create a table of values for the first 8 h of parking.

b) Graph the linear relation.

c) Use the graph to approximate how much it would cost to park for 4 h.

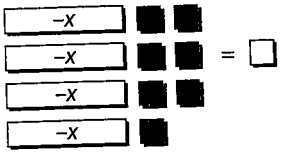
d) Using the graph, approximately how long could you park if you had \$15?

e) What equation models this situation?

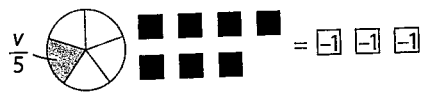
6.3 Modelling and Solving Equations: $ax + b = c$ or $\frac{x}{a} + b = c$, pages 200–207

7. Write and then solve the equation modelled by each diagram. Check your solution.

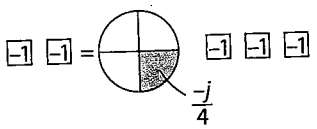
a)



b)



c)



8. Solve each equation. Verify your solution.

a) $-3t + 8 = 20$

b) $5j - 7 = -127$

c) $-12 + 9p = 24$

d) $151 = 12n - 5$

9. Zoë has a collection of albums and movies she downloaded through an online store. The number of albums she has is 3 fewer than 4 times the number of movies. Zoë has 25 albums.

a) Write an equation that represents this situation.

b) How many movies does Zoë have?

10. Solve. Verify your answer.

a) $3 - \frac{v}{-3} = 7$

b) $\frac{d}{3} - 13 = -8$

c) $17 = -4 + \frac{x}{-2}$

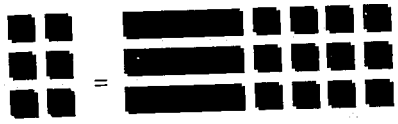
d) $-2 = \frac{n}{4} - 11$

11. In 2014, Saskatchewan's number of registered soccer players was 135 fewer than $\frac{1}{5}$ the number of players registered in British Columbia. Saskatchewan had 23 815 registered soccer players that year. Write and solve an equation to determine how many players British Columbia had.

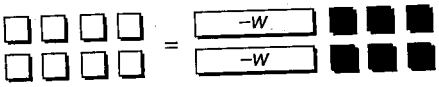
6.4 Modelling and Solving Two-Step Equations: $a(x + b) = c$, pages 208–213

12. Write and then solve the equation modelled by each diagram. Check your solution.

a)



b)



13. Solve. Verify your solution.

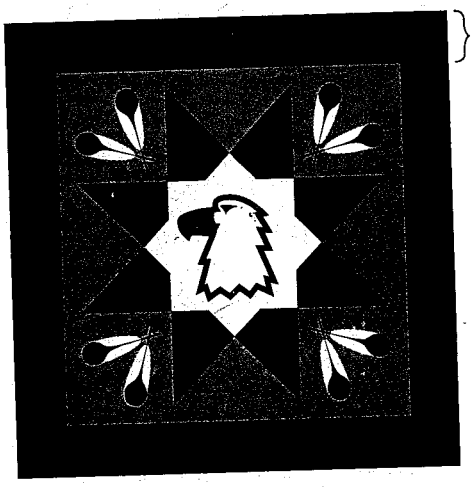
a) $6(q - 13) = -24$

b) $-14 = 2(g + 4)$

c) $-18 = -6(k + 17)$

d) $16 = -4(x - 5)$

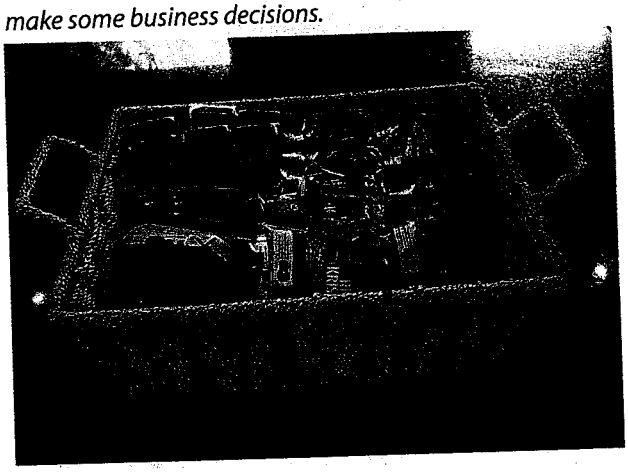
14. Diane wants to create a square star quilt like the one shown below. There will be a 3-cm border around the quilt, and the perimeter of the completed quilt will be 660 cm. Write and solve an equation to determine the dimensions of the quilt before she adds the border.



15. Derek creates wall hangings using felt pieces in the shape of a regular octagon. To reduce the size of his wall hanging, each side of his regular octagon pattern is decreased by 3 cm. If the perimeter of the new octagon is 48 cm, what was the measure of each side of the original octagon?

Connect the Concepts

You are an employee at your school store. You have been asked to use your knowledge of linear equations to help make some business decisions.



16. The wholesale price of a case of 36 fruit bars is \$20. If the bars are sold in the store for \$1/bar, write and solve an equation to determine the amount of profit for the sale of 1 case of fruit bars.

17. The student leadership team volunteers to work and promote sales in the store for one week. The profit made during that week from the sale of granola bars, chips, juice boxes, and frozen milk treats will be donated to charity. The table shows price and average sales of these items.

Product	Price Per Case	Number in Each Case	Average Weekly Sales
Granola bars	\$26	48	96
Chips	\$20	36	144
Juice boxes	\$44	90	180
Frozen milk treats	\$18	18	90

Determine a price per item so that the store makes a profit of at least \$150 during the week. Show your thinking for determining the price for each item.