Chapter 9 Review

9.1 Solving Systems of Linear Equations by Substitution

1. Solve each system of equations by substitution.

a) $2x + 3y = 11$
$5x - y = -15$

b) $3m - n = 5$
$5m - 2n = 8$

c) $3a + b - 7 = 0$
$5a + 2b - 13 = 0$

d) $z - 1 = -3w$
$11 - 5w = 3z$

2. Determine the number of solutions for each system of equations. Identify the answers for the systems that have one solution.

a) $2x + y = 6$
$y - 8 = -2x$

b) $3x + y = 1$
$6x + 2y = 2$

c) $2x + y = -4$
$x + 2y - 6 = 0$

d) $7x + 4y = -9$
$2y - 6 = 0$

3. The world's longest suspension bridge, in Kobe, Japan, and the Capilano Bridge in Vancouver have a combined length of 2129 m. The bridge in Kobe is 74 m longer than 14 times the length of the Capilano Bridge. What is the length of each bridge?

4. A hockey team offers players two annual salary packages. Package A includes a base salary plus \$1000/goal. Package B includes a base salary of \$30 000 less than the base salary in package A plus \$1500/goal. How many goals must be scored for the packages to pay the same amount?

☆5. A board 180 cm long is cut into two pieces such that 3 times the length of the larger piece is 85 cm longer than 4 times the length of the smaller piece. How long are the two pieces of board?

6. Green Health Food store makes quarter-pound and half-pound veggie burgers. One month they sold 3 times as many half-pound burgers as quarter-pound burgers. If the total vegetable mixture used was 378 pounds, what was the total number of burgers sold that month?

9.2 Solving Systems of Linear Equations by Elimination

7. Solve using elimination.

a) $7x - 4y = 26$
$3x + 4y = -6$

b) $5x = 5 - 2y$
$23 + 3x = 4y$

c) $\frac{x}{3} + \frac{y}{2} = \frac{1}{6}$
$-6y + 8 = -x$

d) $8x + 2y = -10$
$3y + 2x = 5$

e) $5 - 3(y - x) + y = 13$
$2(x + y) - 3x + 5y = 10$

☆8. Wade pays a monthly charge for his cell phone plus a charge per text message sent. In January, when he sent 300 text messages, his bill was \$63. Wade missed his February payment, so in March he paid \$142.50 for 675 text messages and a \$12.00 late fee charge.

a) What is Wade's monthly cell phone charge?

b) What is the cost per text message sent?

9. For what values of m and n is $(5, -3)$ the solution to the system of linear equations $mx + ny = -11$ and $2mx - 3ny = 8$?

10. For which system of linear equations is $(-1, 1)$ a solution?

a) $5x + 6y = 1$
$5x + 2y = -3$

b) $3x + 4y = 1$
$5x - 3y = -8$

c) $7x - 3y = 10$
$6x + 5y = -1$

11. Yasmin invested \$2100 in high-yield investments. Part of the \$2100 was invested at 7% per annum and part at 10% per annum. After 1 year the total interest earned was \$166.50. How much did Yasmin invest at each rate?

12. The perimeter of a tennis court is 69 m. The length is 13 m longer than the width. What are the dimensions of the tennis court?

13. The Alberta ski resorts at Marmot Basin in Jasper and Sunshine Village in Banff have a total of 193 runs. If the number of runs at Sunshine is 64 more than half the number of runs at Marmot, how many runs are there at each resort?

9.3 Solving Problems Using Systems of Linear Equations

14. You are given this system of linear equations:

$2x - y = 9$ and $x - \frac{1}{2}y = -5$.

a) Solve the system graphically and algebraically.

b) Use the graphs of these two lines to explain the solution.

15. Michele competed in a running–swimming race of total length 16.5 km. If Michele ran at a speed of 12 km/h and swam at a speed of 3 km/h, how far did she run if she completed the race in 105 min?

★16. Avatar works at an electronics store. He is paid a fixed weekly wage and a commission on his sales. One week, his sales totalled \$15 500 and his take-home pay was \$1015. The following week, his sales were \$9800 and his pay was \$844. What is Avatar's fixed wage and what is his commission rate?

17. Xan rides her bike from home to school in 15 min. If she increases her speed by 5 km/h, she reduces her travel time by 5 min. How far from school does Xan live?

18. Two kayakers paddled downstream on the North Saskatchewan River. They travelled 15 miles in 90 minutes. The return trip took 165 minutes. What was the speed of the current in miles per hour?

19. Mackenzie paid \$187.50 for 2 concert tickets and 2 T-shirts. Awet paid \$408.75 for 5 tickets and 3 T-shirts. What was the cost of a concert ticket?

20. The cost of electricity is charged by usage as measured in kilowatt-hours (kWh). For usage under a fixed amount of kilowatt-hours, the cost is 6.25¢/kWh. For usage for any amount over the fixed amount, the cost is 8¢/kWh. One month Mrs. Richelieu paid \$92.25 for using 1350 kWh of electricity. At what number of kilowatt-hours of usage does the rate increase?

21. The total weight of Marvel's truck and a full load of recyclable asphalt is 45.5 tons. At the waste recycling centre, Marvel is charged \$17 per ton for the asphalt and a service fee of \$1.50 per ton based on the weight of her truck. If Marvel pays \$564.25 to dump a full load of asphalt, what is the weight of Marvel's truck?