

## Discuss the Ideas

1. When you use the elimination strategy to solve a linear system, how can you tell whether you will add equations or subtract them?
2. When you use the elimination strategy to solve a linear system, how do you know when you need to begin by multiplying?

## Exercises

### A

3. Use an elimination strategy to solve each linear system.

|                  |                  |
|------------------|------------------|
| a) $x - 4y = 1$  | b) $3a + b = 5$  |
| $x - 2y = -1$    | $9a - b = 15$    |
| c) $3x - 4y = 1$ | d) $3x - 4y = 0$ |
| $3x - 2y = -1$   | $5x - 4y = 8$    |

4. For each linear system, write an equivalent linear system where both equations have:

i) the same  $x$ -coefficients

ii) the same  $y$ -coefficients

|                  |                     |
|------------------|---------------------|
| a) $x - 2y = -6$ | b) $15x - 2y = 9$   |
| $3x - y = 2$     | $5x + 4y = 17$      |
| c) $7x + 3y = 9$ | d) $14x + 15y = 16$ |
| $5x + 2y = 7$    | $21x + 10y = -1$    |

5. Solve each linear system in question 4.

### B

6. Use an elimination strategy to solve each linear system.

|                  |                  |
|------------------|------------------|
| a) $2x + y = -5$ | b) $3m - 6n = 0$ |
| $3x + 5y = 3$    | $9m + 3n = -7$   |
| c) $2s + 3t = 6$ | d) $3a + 2b = 5$ |
| $5s + 10t = 20$  | $2a + 3b = 0$    |

7. Solve each linear system. Explain what you did for part d.

|                    |                   |
|--------------------|-------------------|
| a) $8x - 3y = 38$  | b) $2a - 5b = 29$ |
| $3x - 2y = -1$     | $7a - 3b = 0$     |
| c) $18a - 15b = 4$ | d) $6x - 2y = 21$ |
| $10a + 3b = 6$     | $4x + 3y = 1$     |

For questions 8 to 11, model each situation with a linear system then solve the problem.

8. The mean attendance at the Winnipeg Folk Festival for 2006 and 2008 was 45 265. The attendance in 2008 was 120 more than the attendance in 2006. What was the attendance in each year?

9. Talise folded 545 metal lids to make cones for jingle dresses for herself and her younger sister. Her dress had 185 more cones than her sister's dress. How many cones are on each dress?



10. Years ago, people bought goods with beaver pelts instead of cash. Two fur traders purchased some knives and blankets from the Hudson's Bay Company store at Fort Langley, B.C. The items and the cost in beaver pelts for each fur trader are shown below:

$$10 \text{ knives} + 20 \text{ blankets} = 200 \text{ beaver pelts}$$

$$15 \text{ knives} + 25 \text{ blankets} = 270 \text{ beaver pelts}$$

What is the cost, in beaver pelts, of one knife and of one blanket?

11. Bernard used an electronic metronome to help him keep time to a guitar piece he was learning to play. He played at a moderate tempo for 4.5 min and at a fast tempo for 30 s. Bernard played a total of 620 beats on the metronome. The rate for the moderate tempo was 40 beats/min less than the rate for the fast tempo. What is the rate in beats per minute for each tempo?



12. Solve each linear system. Explain what you did for part a.

a)  $\frac{a}{2} + \frac{b}{3} = 1$

b)  $\frac{x}{2} + \frac{y}{2} = 7$

$\frac{a}{4} - \frac{2b}{3} = -1$

$3x + 2y = 48$

c)  $0.03x + 0.15y = 0.027$

$-0.5x - 0.5y = 0.05$

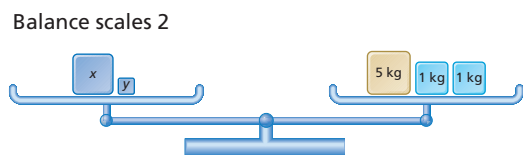
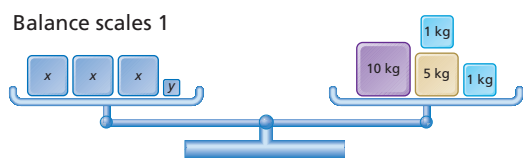
d)  $-1.5x + 2.5y = 0.5$

$2x + y = 1.5$

13. The 2008–09 Edmonton Oilers had 25 players, 17 of whom were over 6 ft. tall. Seven-ninths of the Canadian players were over 6 ft. tall. Three-sevenths of the foreign players were over 6 ft. tall. How many players were Canadian and how many were foreign?

14. Melody surveyed the 76 grade 10 students in her school to find out who played games online. One-quarter of the girls and  $\frac{3}{4}$  of the boys said they played online games with someone over the weekend. Thirty-nine students played online games that weekend. How many girls and how many boys did Melody survey?

15. a) Which linear system is modelled by these two balance scales?



- b) From Balance scales 1, suppose you remove mass  $x$  and mass  $y$  from the left side and 7 kg from the right side. How do you know that the scales will still be balanced?
- c) How does this process help you determine the value of  $x$  and the value of  $y$ ?
- d) How is this process related to the elimination strategy for solving a linear system?

16. To visit the Manitoba Children's Museum in Winnipeg:

■ One adult and 3 children pay \$27.75.

■ Two adults and 2 children pay \$27.50.

Which ticket is more expensive? Justify your answer.



17. A co-op that sells organic food made 25 kg of soup mix by combining green peas that cost \$5/kg with red lentils that cost \$6.50/kg. This mixture costs \$140. What was the mass of peas and the mass of lentils in the mixture?

18. This linear system models a problem about a pentagon.

$3x + 2y = 21$

$x - y = 2$

What might the problem be? Solve the problem you suggest.

19. a) Write a problem that can be modelled by this linear system. Explain how you created the problem.

$3x + y = 17$

$x + y = 7$

- b) Solve the problem you created.

20. Suppose you want to eliminate one variable in the linear system below by adding.

- a) What are two different ways to eliminate a variable?

$3x + 4y = 29$

$2x - 5y = -19$

- b) Solve the system using the two ways you described in part a.