

Exercises

A

4. Use substitution to solve each linear system.

a) $y = 9 - x$	b) $x = y - 1$
$2x + 3y = 11$	$3x - y = 11$
c) $x = 7 + y$	d) $3x + y = 7$
$2x + y = -10$	$y = x + 3$

5. Solve each linear system.

a) $2x + 3y = 11$	b) $4x + y = -5$
$4x - y = -13$	$2x + 3y = 5$
c) $x + 2y = 13$	d) $3x + y = 7$
$2x - 3y = -9$	$5x + 2y = 13$

B

6. a) In each linear system, identify two like terms and say how they are related.

i) $2x - 3y = 2$	ii) $40x + 10y = 10$
$4x - 4y = 2$	$3x + 5y = 5$
iii) $-3x + 6y = 9$	iv) $-3x + 4y = 6$
$5x - 2y = -7$	$9x + 3y = 27$

b) Solve each linear system in part a.

7. a) Suppose you wanted to solve a linear system in the fewest steps. Which of these systems would you choose? Why?

i) $x - y = -5$	ii) $x - y = -5$
$x = -1$	$-x - y = 3$
iii) $2x - 3y = 7$	
$x - 2y = 3$	

b) Solve each linear system in part a. Explain what you did.

8. a) For each equation, identify a number you could multiply each term by to ensure that the equation has only integer coefficients and constants. Explain why you chose that number. Create an equivalent linear system.

$$\frac{x}{3} - \frac{y}{2} = 2$$

$$\frac{5x}{6} + \frac{3y}{4} = 1$$

b) Verify that both linear systems in part a have the same solution.

9. a) For each equation, choose a divisor. Create an equivalent linear system by dividing each term in the equation by that divisor.

$$2x + 2y = -4$$

$$-12x + 4y = -24$$

b) Show that both linear systems in part a have the same solution.

For questions 10 to 18, write a linear system to model each situation. Solve the linear system to solve the related problem.

10. A study recorded the reactions of 186 polar bears as they were approached by a tundra buggy. Some bears did not appear to respond, while others responded by sitting, standing, walking away, or running away. There were 94 more bears that did not respond than did respond. How many bears responded and how many bears did not respond?

11. Louise purchased a Métis flag whose length was 90 cm longer than its width. The perimeter of the flag was 540 cm. What are the dimensions of the flag?



12. Forty-five high school students and adults were surveyed about their use of the internet. Thirty-one people reported a heavy use of the internet. This was 80% of the high school students and 60% of the adults. How many students and how many adults were in the study?

13. Many researchers, such as those at the Canadian Fossil Discovery Centre at Morden, Manitoba, involve students to help unearth fossil remains of 80 million-year-old reptiles. Forty-seven students are searching for fossils in 11 groups of 4 or 5. How many groups of 4 and how many groups of 5 are searching?



14. An art gallery has a collection of 85 Northwest Coast masks of people and animals. Sixty percent of the people masks and 40% of the animal masks are made of yellow cedar. The total number of yellow cedar masks is 38. How many people masks and how many animal masks are there?
15. Sam scored 80% on part A of a math test and 92% on part B of the math test. His total mark for the test was 63. The total mark possible for the test was 75. How many marks is each part worth?
16. Five thousand dollars was invested in two savings bonds for one year. One bond earned interest at an annual rate of 2.5%. The other bond earned 3.75% per year. The total interest earned was \$162.50. How much money was invested in each bond?
17. Tess has a part-time job at an ice-cream store. On Saturday, she sold 76 single-scoop cones and 49 double-scoop cones for a total revenue of \$474.25. On Sunday, Tess sold 54 single-scoop cones and 37 double-scoop cones for a total revenue of \$346.25. What is the cost of each cone?
18. Joel has a part-time job that pays him \$40 per weekend. Sue has a part-time job that paid a starting bonus of \$150, then \$30 per weekend. For how many weekends would Joel have to work before he earns the same amount as Sue? Justify your answer.

19. Solve each linear system.

a) $\frac{1}{2}x + \frac{2}{3}y = 1$ b) $\frac{3}{4}x + \frac{1}{2}y = -\frac{7}{12}$

$\frac{1}{4}x - \frac{1}{3}y = \frac{5}{2}$ $x - y = -\frac{4}{3}$

c) $\frac{1}{3}x - \frac{3}{8}y = 1$ d) $\frac{7}{4}x + \frac{4}{3}y = 3$

$-\frac{1}{4}x - \frac{1}{8}y = \frac{3}{2}$ $\frac{1}{2}x - \frac{5}{6}y = 2$

20. This linear system was used to solve a problem about the cost of buying reams of printer paper and ink cartridges for a school computer lab:

$$7.50r + 45c = 375$$

$$r - c = 15$$

- a) Create a situation that can be modelled using the linear system. Write a related problem.
- b) Solve the system and the problem.
21. Create a situation that can be modelled by this linear system. Write a related problem. Solve the system and the problem.

$$2x + 4y = 98$$

$$x + y = 27$$

22. a) Write a linear system that is equivalent to this system. Explain what you did.

$$2x - y = -4$$

$$3x + 2y = 1$$

- b) Solve each linear system. How do your solutions show that the systems are equivalent?

C

23. One weekend, members of a cycling club rode on the KVR trail (Kettle Valley Railway) uphill from Penticton in Okanagan, B.C. The uphill climb reduced the cyclists' usual average speed by 6 km/h and they took 4 h to get to Chute Lake. On the return trip, the downhill ride increased the cyclists' usual average speed by 4 km/h. The return trip took 2 h.
- a) What is the usual average speed?
- b) What is the distance from Penticton to Chute Lake?