FREQUENTLY ASKED Questions

Fruit	Price per Kilogram ($)
cherries	10.98
peaches	2.18

Amount of Cherries vs. Peaches

Q: **How can you represent the ordered pairs of a linear relation?**

A: You can use variables to create an equation and then list the ordered pairs in a table of values or plot them as points to create a graph.

EXAMPLE

Prices for cherries and peaches in July of one year are listed at the left. What amounts of cherries and peaches can you buy for $15?

Solution

Write an equation to describe the relation:
- c kilograms of cherries cost $10.98c$.
- p kilograms of peaches cost $2.18p$.
- The total amount of money to buy the cherries and peaches is $15.

The equation $10.98c + 2.18p = 15$ describes the linear relation between p and c. Use this equation to calculate the approximate coordinates of ordered pairs.

Amount of Cherries, c (kg)	0	0.40	0.80	1.00
Amount of Peaches, p (kg)	$\dfrac{15.00}{2.18} = 6.88$	4.87	2.85	1.84

Graph the linear relation by hand, by plotting two or more ordered pairs and drawing a straight line through the points.

Q: **How can you solve a linear equation in one variable using a linear relation?**

A: Each ordered pair, or point, on the graph of a linear relation represents the solution to the related linear equation.

EXAMPLE

Consider $0.03x + 0.04y = 120$, where x represents the amount of money invested at 3%/year and y represents the amount invested at 4%/year. The total interest earned for one year was $120. If $1500 was invested at 3%/year, how much was invested at 4%/year?

Solution

Solve $0.03(1500) + 0.04y = 120$.

Solving the Equation Algebraically

$$0.03(1500) + 0.04y = 120$$
$$45 + 0.04y = 120$$
$$45 + 0.04y - 45 = 120 - 45$$
$$0.04y = 75$$
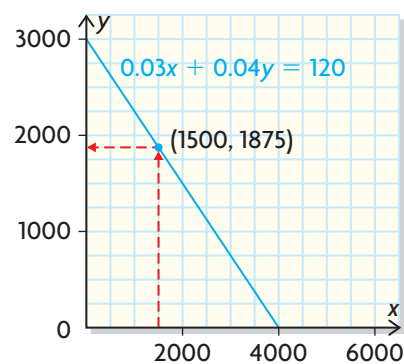$$\frac{0.04y}{0.04} = \frac{75}{0.04}$$
$$y = 1875$$

The amount invested at 4%/year was $1875.

Solving the Equation Graphically

Determine the point with an x-coordinate of 1500 on the graph of the relation. The y-coordinate of this point is the solution to the equation.
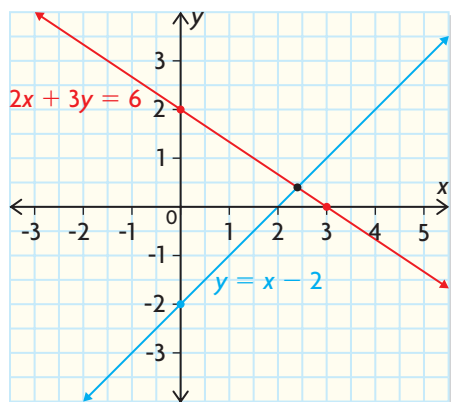
$$y = 1875$$

The amount invested at 4%/year was $1875.

Q: **How can you solve a linear system of equations using graphs?**

A: Graph the equations on the same axes by hand or using graphing technology. The coordinates of the point where the lines intersect give the solution to the system.

> **Study** | *Aid*
> - See Lesson 1.3, Examples 1 to 3.
> - Try Mid-Chapter Review Questions 6 to 10.

EXAMPLE

Solve $y = x - 2$ and $2x + 3y = 6$.

Solution

Graphing by Hand

From the graph, the solution is $x \doteq 2.5$ and $y \doteq 0.5$.
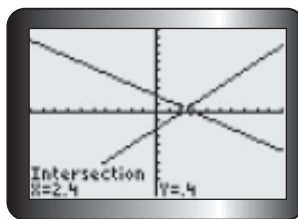
Graphing with Technology

Write the second equation in the form $y = mx + b$:

$$3y = 6 - 2x$$
$$y = 2 - \frac{2}{3}x \text{ or } y = -\frac{2}{3}x + 2$$

Enter both equations, and use the Intersect operation.

From the graph on the calculator, the solution is $x = 2.4$ and $y = 0.4$.

PRACTICE Questions

Lesson 1.1

1. Doreen has $10 to buy apples and pears.

Fruit	Price per Kilogram ($)
apples	2.84
pears	2.18

Use each representation below to determine the possible amounts of each type of fruit she can buy.

a) a table   **b)** a graph   **c)** an equation

2. Jon downloads music to his MP3 player from a site that charges $12.95 per month and $0.45 per song. Another site charges $8.99 per month and $0.95 per song. Compare the cost of the two sites using a table and a graph.

Lesson 1.2

3. The graph shows how Sally's weekly earnings vary with the dollar value of the sales she makes at a clothing store.

Sally's Earnings vs. Sales
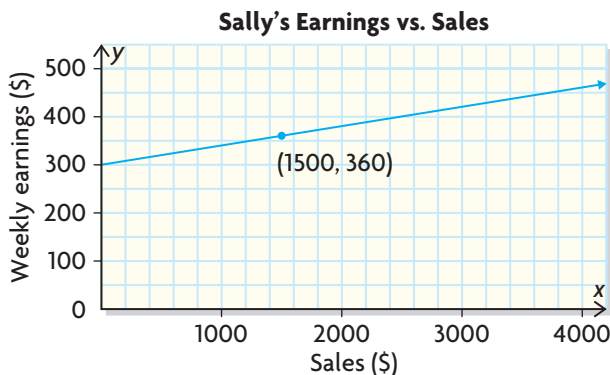
a) What do the coordinates (1500, 360) mean?
b) Use the graph to determine what Sally earns when her sales are $3200.
c) Use the graph to determine what sales Sally needs to make if she wants to earn $450.
d) Check your answers for parts b) and c) algebraically.

4. a) Determine an equation for the perimeter of any rectangle whose width is 8 cm less than its length.
b) Determine the length of the rectangle whose width is 72 cm.

5. Len plans to invest money he has saved so that he can earn $100 interest in one year. He will deposit some of his money in an account that pays 4%/year. He will use the rest of his money to buy a one-year GIC that pays 5%/year.
a) Write an equation for Len's situation, and draw a graph.
b) Suppose that Len buys a GIC for $1500. Use your graph to determine how much he would need to put in the account.
c) Suppose that Len deposits $2200 in the account. Determine how much he would need for the GIC.

Lesson 1.3

6. Solve each linear system.

a) $y = x + 4$
$y = -2x + 1$

b) $y = 4x - 7$
$2x - 3y = 6$

c) $3x - y = 3$
$2x + y = 2$

d) $5x - 2y = 10$
$2x + 4y = 4$

7. Solve each linear system.

a) $y = 5x - 8$
$10x - 5y = 7$

b) $2x + y = 2$
$x - \frac{1}{2}y = 4$

c) $x - 4y = -1$
$-3x + 8y = -2$

d) $x + y = 0.7$
$5x - 4y = -1$

8. The art department at a school sold 323 tickets to an art show, for a total of $790. Students paid $2 for tickets, and non-students paid $3.50. The principal asked how many non-students attended the art show.
a) Write a system of two linear equations for this situation.
b) Solve the problem by graphing the system.

9. Suppose you are solving the system $y = 2x + m$ and $3x - y = n$, where m and n are integers. Could this system have solutions in all four quadrants? Justify your answer.

10. Create a situation that can be represented by a system of linear equations that has the ordered pair (5, 12) as its solution.