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# Solving Systems of Linear Equations Graphically

Show You Know

Ex. 1

David earns $40 plus $10 per hour. Carmen earns $50 plus $8 per hour.

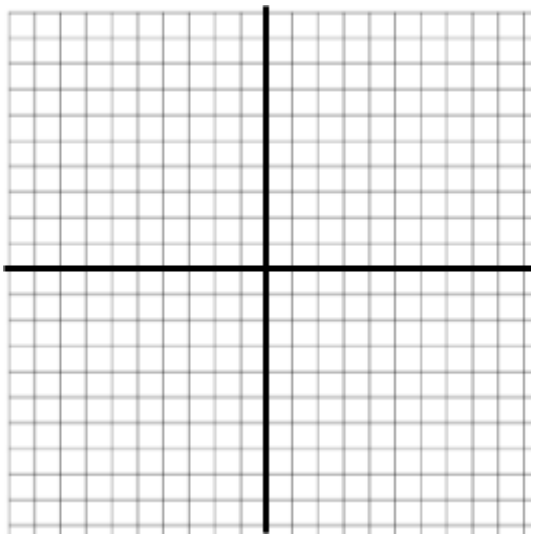
a) Represent the linear system relating the earnings numerically and graphically.

David

| Hours Worked | Amount Earned ($) |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |

Carmen

| Hours Worked | Amount Earned ($) |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |



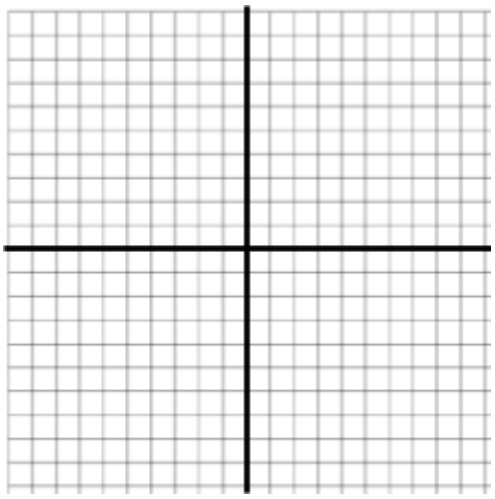
b) Identify the solution to the linear system and explain what it represents.

Ex. 2

Verify by graphing and using a table of values that (3, -2) is the solution to the system of linear equations x - 3y = 9 and 2x + y = 4.

| x | y= |
|---|---|
| 0 | |
| 1 | |
| 2 | |
| 3 | |
| 4 | |

| x | y= |
|---|---|
| 0 | |
| 1 | |
| 2 | |
| 3 | |
| 4 | |



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Ex. 3

For each system of linear equations, verify whether the given point is a solution. Explain what the results would show on a graph.

a)

$$3x - y = 2$$
$$x + 4y = 32$$
$$(2\,,\,5)$$

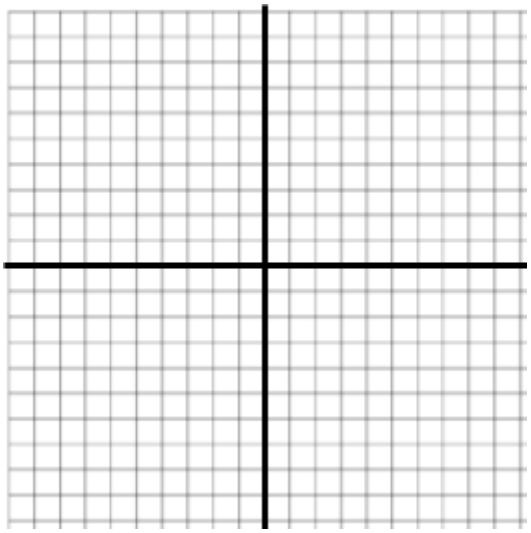
b)

$$2x + 3y = -12$$
$$4x - 3y = -6$$
$$(-3\,,-2)$$

Ex. 4

Eric works on the 23rd floor of a building. It takes Eric 90 s to walk down the stairs to the 14th floor. Nathan works on the 14th floor and needs to go up to the 30th floor. He knows it will take 40 s by elevator if the elevator makes no other stops. Suppose both men leave their offices at the same time.

a) Create a graph to model their travel.



b) What does the point of intersection represent?

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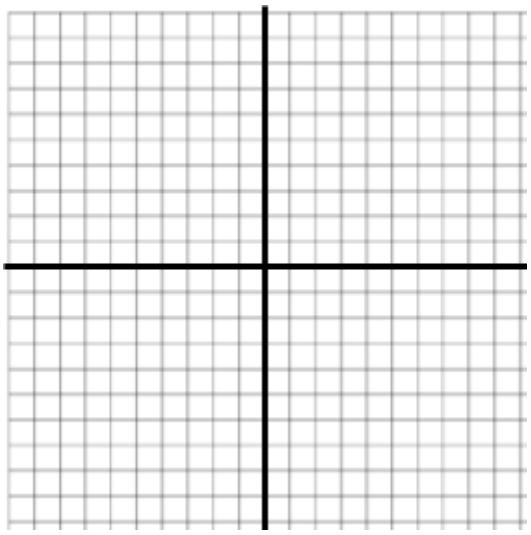
*Solving Systems of Linear Equations Graphically*

Practice

1. Determine graphically whether each given point is a solution to the system of linear equations.

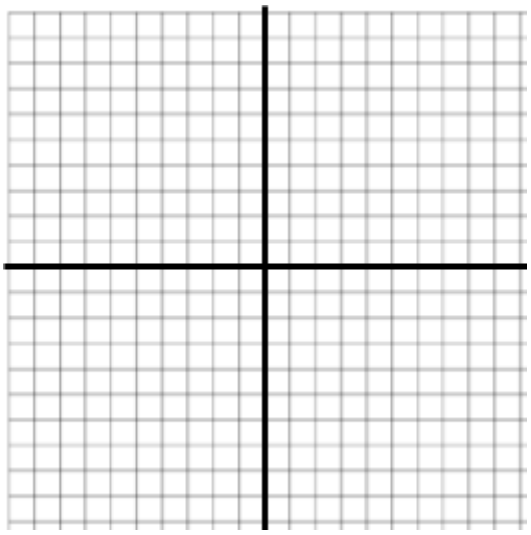
a)

$$y = 4x - 9$$
$$y = -2x + 3$$
$$(2, -1)$$



b)

$$x + y = 7$$
$$3x - 2y = -3$$
$$(2, 5)$$



2. Rewrite the equations in slope-intercept form. Then, use technology to graph each pair of equations and determine the point of intersection.

a)

$$x + y = 6$$
$$2x - y = 2$$

b)

$$x - 4y = -2$$
$$y = -x - 5$$

c)

$$3x + 4y = 0$$
$$2x - 2y + 14 = 0$$

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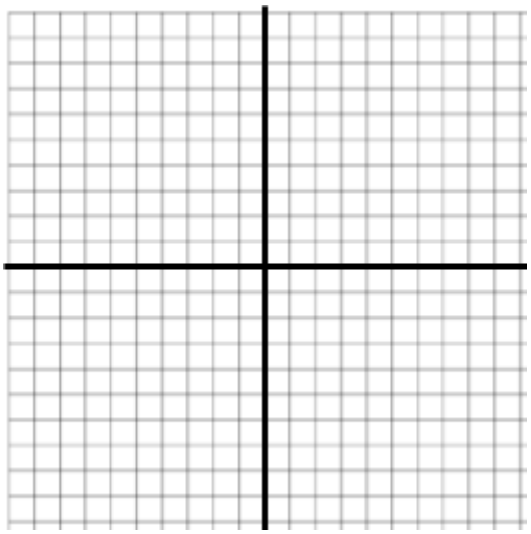
3. Alan has $10 and saves $0.50 each day. Vanessa has $5 and saves $1 each day.
   a. Create a system of linear equations (two equations) to model the amount of money, M, in dollars, that each of Alan and Vanessa has in terms of days, d.

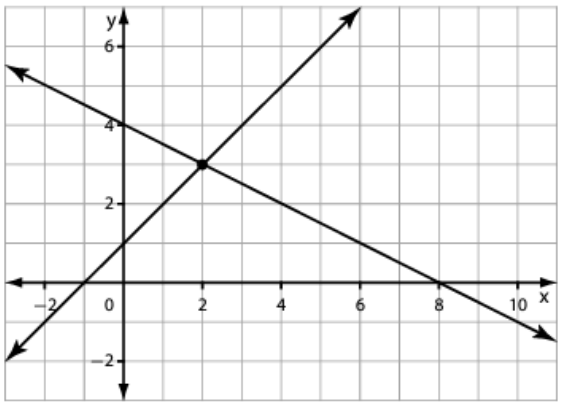
   b. Use a graph to determine when Alan and Vanessa will have the same amount of money. How much money will each of them have on that day?



4. The graph represents a system of linear equations. For each line, determine the
   a. x-intercept

   b. y-intercept

   c. slope




   d. point of intersection with the other line

   e. equation

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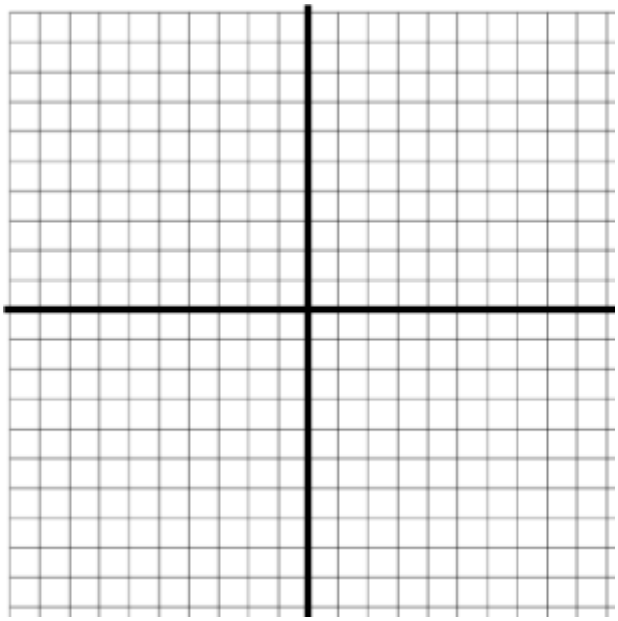
5. Two large tanks of oil are being drained. The first tank contains 125 $m^3$ of oil and is being emptied at a rate of 2.5 $m^3$ per minute. The second tank contains 80 $m^3$ of oil and is being drained at a rate of 1 $m^3$ per minute.

    a. Create a system of linear equations to model the amount of oil, A, remaining in each tank in terms of time, t.

    b. Graph the equations together to identify the point of intersection.



    c. What does the point of intersection mean in the context of the problem?

    d. Use your graph to determine which tank will be empty first.