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Unit 3, Lesson 14: Using Linear Relations to Solve Problems

Let's write equations for real-world situations and think about their solutions.

14.1: Buying Fruit

For each relationship described, write an equation to represent the relationship.

1. Grapes cost \$2.39 per pound. Bananas cost \$0.59 per pound. You have \$15 to spend on g pounds of grapes and b pounds of bananas.

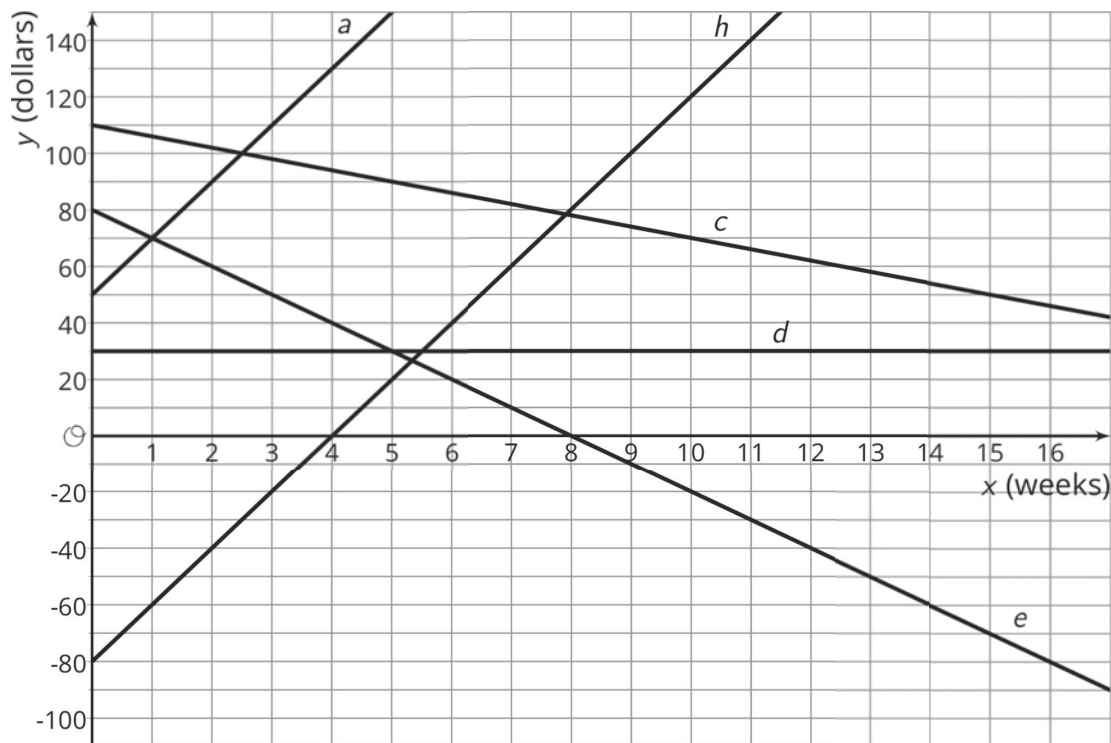
2. A savings account has \$50 in it at the start of the year and \$20 is deposited each week. After x weeks, there are y dollars in the account.

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14.2: Five Savings Accounts



Each line represents one person's weekly savings account balance from the start of the year.

1. Choose one line and write a description of what happens to that person's account over the first 17 weeks of the year. Do not tell your group which line you chose.

2. Share your story with your group and see if anyone can guess your line.

3. Write an equation for each line on the graph. What do the slope, m , and vertical intercept, b , in each equation mean in the situation?

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3. Sketch a graph of the relationship. Label your axes.

4. On your graph, plot and label the combinations A—F.

	A	B	C	D	E	F
pounds of tilapia	5	19	27	25	65	55
pounds of salmon	36	30.6	25	27	6	4

a. Which of these combinations can the market order? Explain or show your reasoning.

5. List two ways you can tell if a pair of numbers is a solution to an equation.

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- The owner of a new restaurant is ordering tables and chairs. He wants to have only tables for 2 and tables for 4. The total number of people that can be seated in the restaurant is 120.
 - Describe some possible combinations of 2-seat tables and 4-seat tables that will seat 120 customers. Explain how you found them.
 - Write an equation to represent the situation. What do the variables represent?
 - Create a graph to represent the situation.
 - What does the slope tell us about the situation?
 - Interpret the x and y intercepts in the situation.
- Triangle A is an isosceles triangle with two angles of measure x degrees and one angle of measure y degrees.
 - Find three combinations of x and y that make this sentence true.

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b. Write an equation relating x and y .

c. If you were to sketch the graph of this linear equation, what would its slope be? How can you interpret the slope in the context of the triangle?

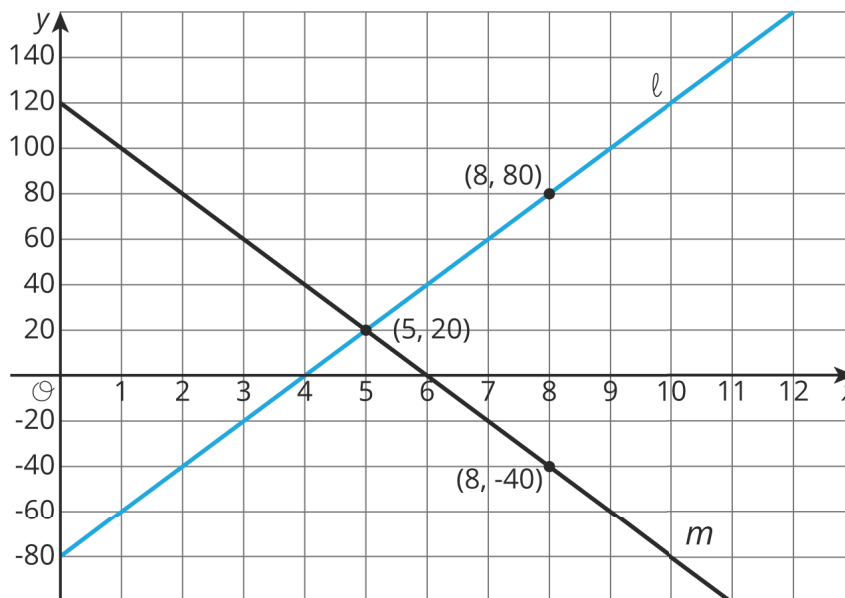
(from Unit 3, Lesson 13)

3. Select **all** the equations for which $(-6, -1)$ is a solution.

- A. $y = 4x + 23$
- B. $3x = \frac{1}{2}y$
- C. $2x - 13y = 1$
- D. $3y = \frac{1}{2}x$
- E. $2x + 6y = -6$

(from Unit 3, Lesson 12)

4. Consider the following graphs of linear equations. Decide which line has a positive slope, and which has a negative slope. Then calculate each line's exact slope.



(from Unit 3, Lesson 10)