

Name Key
Mrs. Roumbos

Date _____
8R Period _____

Systems Word Problems

1) Eve sells pretzels and juice at a pretzel stand. One morning she sells 14 pretzels and 8 juices and makes a total of \$58. In the afternoon she sells 22 pretzels and 16 juices for \$98. How much does Eve charge for one pretzel? How much does she charge for one juice?

No variables

Legend
Let
x = the cost of 1 pretzel
y = the cost of 1 juice

Equation

$$\begin{aligned}
 14x + 8y &= 58 & \rightarrow & 308x + 176y = 1276 \\
 22x + 16y &= 98 & \rightarrow & -308x - 224y = -1372 \\
 \hline
 -48y &= -96 & & \\
 -48 & & -48 & \\
 \hline
 y &= 2 & &
 \end{aligned}$$

$$\begin{aligned}
 14x + 8y &= 58 \\
 14x + 8(2) &= 58 \\
 14x + 16 &= 58 \\
 \hline
 14x &= 42 \\
 14 & & 14 & \\
 \hline
 x &= 3 & &
 \end{aligned}$$

Solution
The cost of 1 pretzel is \$3
+
the cost of 1 juice is \$2

Check
14(3) = 42
8(2) = 16

58 ✓

22(3) = 66
16(2) = 32

98 ✓

2) A grocer bought 3 boxes of peaches and 5 boxes of pears for \$59. Another grocer bought 5 boxes of peaches and 2 boxes of pears from the same dealer for \$54. Find the cost of one box of peaches and 1 box of pears.

Legend
Let
x = the cost of 1 box of peaches
y = the cost of 1 box of pears

Equation

$$\begin{aligned}
 3x + 5y &= 59 & \rightarrow & 15x + 25y = 295 \\
 5x + 2y &= 54 & \rightarrow & -15x - 6y = -162 \\
 \hline
 19y &= 133 & & \\
 19 & & 19 & \\
 \hline
 y &= 7 & &
 \end{aligned}$$

$$\begin{aligned}
 3x + 5y &= 59 \\
 3x + 5(7) &= 59 \\
 3x + 35 &= 59 \\
 \hline
 3x &= 24 \\
 3 & & 3 & \\
 \hline
 x &= 8 & &
 \end{aligned}$$

Solution
The cost of 1 box of peaches is \$8.
+
the cost of 1 box pears is \$7.

Check
3(8) = 24
5(7) = 35

59 ✓

5(8) = 40
2(7) = 14

54 ✓

③ EXAMPLE Solving a Real-World Problem by Graphing

Keisha and her friends visit the concession stand at a football game. The stand charges \$2 for a hot dog and \$1 for a drink. The friends buy a total of 8 items for \$11. Tell how many hot dogs and how many drinks they bought.

- A Let x represent the number of hot dogs they bought and y represent the number of drinks they bought.

Write an equation representing the number of items they purchased.

Number of hot dogs	+	Number of drinks	=	Total items	$\begin{array}{r} x+y=8 \\ -x \quad -x \\ \hline y=-x+8 \end{array}$
x		y	=	8	

Write an equation representing the money spent on the items.

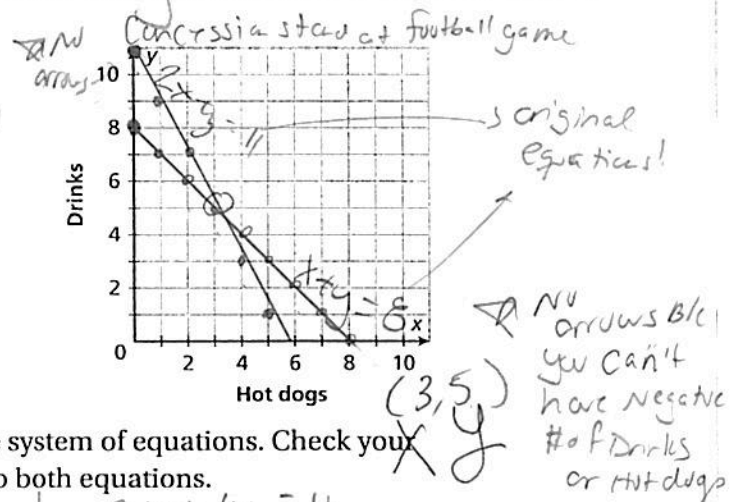
Cost of 1 hot dog times number of hot dogs	+	Cost of 1 drink times number of drinks	=	Total cost	$\begin{array}{r} 2x+y=11 \\ -2x \quad -2x \\ \hline y=-2x+11 \end{array}$
$2x$		$1y$	=	11	

- B Write your equations in slope-intercept form. ($y=mx+b$)

$y = -x + 8$ and $y = -2x + 11$

- C Graph the solutions of both equations.

$y = -x + 8$ $m: -\frac{1}{1} \rightarrow$ $b: 8$	$y = -2x + 11$ $m: -\frac{2}{1} \rightarrow$ $b: 11$
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- D Use the graph to identify the solution of the system of equations. Check your answer by substituting the ordered pair into both equations.

$x+y=8$ $3+5=8$ $8=8$	$2x+1y=11$ $2(3)+1(5)=11$ $6+5=11$ $11=11$
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The point (3, 5) is a solution of both equations.

- E Interpret the solution in the original context.

Keisha and her friends bought 3 hot dog(s) and 5 drink(s).

REFLECT

3. Conjecture Why do you think the graph is limited to the first quadrant?

B/c you can't have a negative amount of hot dogs + drinks