

Honors Algebra II Trig - NASH
2.1 Linear Systems Day 2

Name: Key

1) A music store offers piano lessons at a discount for customers buying new pianos. The costs for lessons and a one-time fee for materials (including music books, CDs, software, etc.) are shown in the advertisement. What is the cost of each lesson and the one-time fee for materials?



$x = \text{lesson} \quad y = \text{mat. fee}$

$$\begin{aligned} -(6x + y = 300) & \quad -6x - y = -300 & x = \$30 \text{ cost lesson} \\ 12x + y = 480 & \quad \underline{12x + y = 480} & y = \$120 \text{ mat fee} \\ & \quad \quad \quad 6x = 180 \end{aligned}$$

2) Suppose you have a part-time job delivering packages. Your employer pays you a flat rate of \$9.50 per hour. You discover that a competitor pays employees \$2 per hour plus \$3 per delivery. How many deliveries would the competitor's employees have to make in four hours to earn the same pay you earn in a four-hour shift?

$x = \text{\# hours} \quad y = \text{\$ made} \quad d = \text{\# deliveries}$

$$y = 9.5x \quad y = 2x + 3d$$

a) Write a system of equations that models the situation.

$4 \text{ hours} = \$38$

b) Which method should you use to solve the system and why?

$$\begin{aligned} 2(4) + 3d &= 38 \\ 3d &= 30 \\ d &= 10 \end{aligned}$$

c) Interpret the solution in the context of the problem.

In 4 hours, they would need to make 10 deliveries to earn the same amount.

3) **Error Analysis:** Identify the error(s) in planning the solution or solving the problem. Then, correct the error and solve the problem.

You spend \$4.30 on 3 yogurts and 2 juice boxes. A friend spent \$2.60 on 1 juice box and 2 yogurts. What is the cost of 1 yogurt? What is the cost of 1 juice box?

Let $y = \text{cost of 1 yogurt}$ and $x = \text{cost of 1 juice box}$.

$$\begin{cases} 3y + 2x = 4.3 \\ 1y + 2x = 2.6 \end{cases}$$

Student switched variables in the 2nd equation.

$$\begin{array}{lcl} 3y + 2x = 4.3 & \Rightarrow & 3y + 2x = 4.3 \\ 1y + 2x = 2.6 & \Rightarrow & -1y - 2x = -2.6 \\ & & \hline & & 2y = 1.7 \\ & & y = 0.85 \end{array} \qquad \begin{array}{l} 1y + 2x = 2.6 \\ 0.85 + 2x = 2.6 \\ 2x = 1.75 \\ x = 0.875 \approx 0.88 \end{array}$$

One yogurt costs \$0.85. One juice box costs \$0.88.

$$\begin{aligned} 3y + 2x &= 4.3 \\ -2(2y + 1x &= 2.60) \\ \hline -y &= -0.9 \\ \boxed{y} &= \boxed{90\text{¢}} \end{aligned} \qquad \begin{aligned} 3y + 2x &= 4.30 \\ -4y - 2x &= -5.20 \\ \hline -y &= -0.9 \\ \boxed{y} &= \boxed{90\text{¢}} \end{aligned} \qquad \begin{aligned} 2(.90) + x &= 2.60 \\ 1.80 + x &= 2.60 \\ \boxed{x} &= \boxed{80\text{¢}} \end{aligned}$$

Solve using Augmented Matrices (calculator).

$$4) \begin{cases} 5x + y = 9 \\ 10x - 7y = -18 \end{cases}$$

$$x = 1 \\ y = 4$$

$$5) \begin{cases} x - y = 6 \\ 2x + y = 9 \end{cases}$$

$$x = 5 \\ y = -1$$

$$6) \begin{cases} 8x + 14y = 4 \\ -6x - 7y = -10 \end{cases}$$

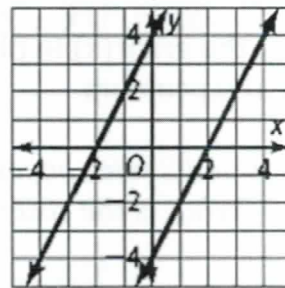
$$x = 4 \\ y = -2$$

7) **Error Analysis:** Your teacher asked the class to graph the system of equations to find the solution. You turned in Graph A and said there were no solutions. Your friend turned in Graph B and said there were infinite solutions. Which of you is correct? What mistake was made?

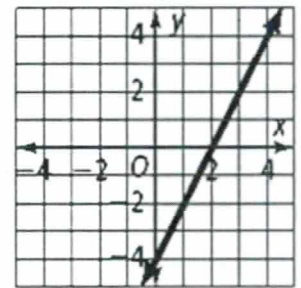
$$\begin{cases} 3y = 6x - 12 & y = 2x - 4 \\ -5y = -10x - 20 & y = 2x + 4 \end{cases}$$

I am correct because the graphs have the same slope but different y-intercepts so they will never intersect.

Graph A



Graph B



8) An online music company offers 15 downloads for \$19.75 and 40 downloads for \$43.50. Each price includes the same one-time registration fee. What is the cost of each download and the registration fee?

$$\begin{array}{r} -(15x + y = 19.75) \\ 40x + y = 43.50 \\ \hline 25x = 23.75 \\ x = .95 \end{array}$$

$x = \text{cost download } 95\phi$
 $y = \text{registration fee } \5.50

$$15(.95) + y = 19.75 \\ y = 5.50$$

9) A test has twenty questions worth 100 points. The test consists of True/False questions worth 3 points each and short answer questions worth 11 points each. How many short answer questions are on the test?

$$\begin{array}{r} x = \# \text{ T/F} \\ y = \# \text{ SA} \\ -3(x + y = 20) \\ 3x + 11y = 100 \\ \hline 8y = 40 \\ y = 5 \end{array}$$

5 short answer ? 5