

Systems of Equations Word Problems

(solved algebraically)

The equations $6x+5y=300$ and $3x+7y=285$ represent the money collected from selling gift baskets in a school fundraising event. If x represents the cost for each snack gift basket and y represents the cost for each chocolate gift basket, what is the cost for each chocolate gift basket?



(a) \$20

(b) \$25

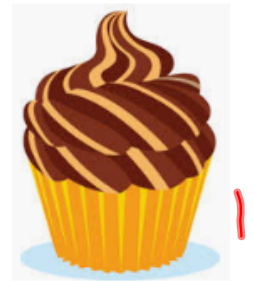
(c) \$30

(d) \$54

$$\begin{array}{l}
 3(6x + 5y = 300) \rightarrow 18x + 15y = 900 \\
 6(3x + 7y = 285) \rightarrow 18x + 42y = 1710 \\
 \hline
 -27y = -810 \\
 \hline
 y = 30
 \end{array}$$

Franco and Caryl went to a bakery to buy desserts. Franco bought 3 packages of cupcakes and 2 packages of brownies for \$19. Caryl bought 2 packages of cupcakes and 4 packages of brownies for \$24. Let x equal the price of one package of cupcakes and y equal the price of one package of brownies. Write a system of equations that describes the given situation. On the set of axes below, graph the system of equations. Determine the exact cost of one package of cupcakes and the exact cost of one package of brownies in dollars and cents. Justify your solution.

$$\begin{aligned} \text{Franco } & 3c + 2b = 19 \\ \text{Caryl } & 2c + 4b = 24 \end{aligned}$$



$$\begin{array}{r} 6c + 4b = 38 \\ -6c + 12b = 72 \\ \hline -8b = -34 \\ \hline -8 \quad -8 \end{array}$$

$$\begin{array}{r} 2c + 4b = 24 \\ 2c + 4(4.25) = 24 \\ 2c + 17 = 24 \\ -17 \quad -17 \\ \hline 2c = 7 \\ \hline c = 3.5 \end{array}$$

brownies: \$4.25
cupcakes: \$3.50

Jack bought 3 slices of cheese pizza and 4 slices of mushroom pizza for a total cost of \$12.50. Grace bought 3 slices of cheese pizza and 2 slices of mushroom pizza for a total cost of \$8.50. What is the cost of one slice of mushroom pizza?

y



a) Write an equation for Jack

$$3x + 4y = 12.50$$

b) Write an equation for Grace—

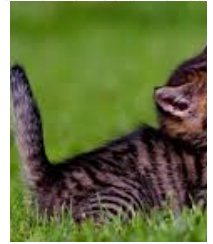
$$- \quad 3x + 2y = 8.50$$

c) Solve

$$\frac{2y}{2} = \frac{4}{2}$$

$$y = \$2$$

An animal shelter spends \$4.00 per day to care for each bird and \$4.50 per day to care for each cat. Lincoln noticed that the shelter spent \$175.50 caring for birds and cats on Wednesday. Lincoln found a record showing that there were a total of 41 birds and cats on Wednesday.



Write a system of equations to represent this scenario.

$$\begin{aligned} \$: & \quad 1(4b + 4.50c = 175.50) \\ \# \text{ items:} & \quad 4(1b + 1c = 41) \end{aligned}$$

How many birds were at the shelter on Wednesday?

$$\begin{array}{r} 4b + 4.50c = 175.50 \\ -4b + -4c = 164 \\ \hline .5c = 11.5 \\ \hline .5 \quad .5 \\ \hline c = 23 \end{array}$$

$$\begin{array}{r} b + c = 41 \\ b + 23 = 41 \\ -23 \quad -23 \\ \hline b = 18 \end{array}$$

Sydney and Mila go to the movie theater and purchase refreshments for their friends.

Sydney spends a total of \$28.50 on 9 drinks and 2 bags of popcorn.

Mila spends a total of \$42.50 on 5 drinks and 10 bags of popcorn.



Write a system of equations that can be used to find the price of one drink and the price of one bag of popcorn.

$$\begin{aligned} 9x + 2y &= 28.50 \\ 5(9x + 2y) &= 5(28.50) \\ 45x + 10y &= 142.50 \\ 9(5x + 10y) &= 9(42.50) \\ 45x + 90y &= 382.50 \end{aligned}$$

Using these equations, determine and state the price of each, to the nearest cent.

$$\begin{aligned} 9x + 2y &= 28.50 \\ 9x + 6y &= 28.50 \\ \hline -4y &= -6 \\ \hline y &= 1.5 \end{aligned}$$

$$\begin{aligned} 45x + 10y &= 142.50 \\ -45x + 90y &= -382.50 \\ \hline 80y &= -240 \\ \hline y &= -3 \end{aligned}$$

$y = \$3$ (popcorn)

$$\begin{aligned} 9x + 2(3) &= 28.50 \\ 9x + 6 &= 28.50 \\ \hline 9x &= 22.50 \\ \hline x &= 2.50 \end{aligned}$$

$x = \$2.50$ (drinks)

Matt and Ming are selling fruit for a school fundraiser. Customers can buy small boxes of oranges and large boxes of oranges. Matt sold 3 small boxes of oranges and 14 large boxes of oranges for a total of \$203. Ming sold 11 small boxes of oranges and 11 large boxes of oranges for a total of \$220. Find the cost each of one small box of oranges and one large box of oranges.

a) Write an equation for Matt

b) Write an equation for Ming

c) Now solve for the cost of the small and large boxes of oranges



The admission fee at a small fair is \$1.50 for children and \$4.00 for adults. On a certain day, 2200 people enter the fair and \$5050 is collected. How many children and how many adults attended?

$$\begin{array}{l} \$: 1.50c + 4a = 5050 \\ \text{items} : c + a = 2200 \end{array}$$



