

Systems of Linear Equations Word Problems Answers and Explanations

Answer Key

1. C 2. D 3. B 4. B 5. C 6. D 7. C 8. C 9. A 10. B

Answer Explanations

1. **C.** First let's set up a system of equations to solve this problem in which b represents the number of burgers sold and f represents the number of fries sold.

$$5.2b + 3.2f = 225.20$$

$$b + f = 56$$

We can isolate the second equation to find the order of fries in terms of order of burgers.

$$f = 56 - b$$

Now we can substitute f to find the number of burgers sold.

$$5.2b + 3.2(56 - b) = 225.20$$

$$5.2b + 179.2 - 3.2b = 225.20$$

$$2b = 46$$

$$b = 23 \text{ burgers sold}$$

2. **D.** First, we must set up a system of equations to represent the coffee shop's new menu addition. Let D represent the Dark Roast in pounds and E represent the Exotica Blend in pounds.

$$D + E = 100$$

$$xD + 1.4xE = 800$$

Now, we know that the shop plans to buy 75 pounds of Dark Roast and 25 pounds of Exotica blend, so we can solve for x in the second equation.

$$75x + 25(1.4)x = 800$$

$$110x = 800$$

$$x \approx 7.27$$

Now we plug that back into our original equation to find the prices of the blends.

$$7.27D + (1.4)(7.27)E = 800$$

$$7.27D + 10.18E = 800$$

Thus, we can see the price for Dark Roast to be \$7.27 and the price for Exotica to be \$10.18.

3. **B.** Since we are finding the amount of days until both fruits are at the same price, we can set the two equations equal to one another and solve for x .

$$4.6 - 0.2x = 3.4 - 0.1x$$

$$1.2 = 0.1x$$

$$12 \text{ days} = x$$

4. **B.** First, we must set up our system of equations. Let E represent economy class while F represents first class.

$$E + F = 200$$

$$120E + 300F = 30,300$$

Now we isolate the first equation to find E in terms of F :

$$E = 200 - F$$

Substitute and solve for F , the number of first-class seats.

$$120(200 - F) + 300F = 30,300$$

$$24,000 - 120F + 300F = 30,300$$

$$180F = 6,300$$

$$F = 35 \text{ first-class seats}$$

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5. **C.** Let S represent the standard rope's length in yards and U represent the ultra-strength rope's length in yards. We know that Karen wants 50 yards of rope, so our first equation is given as such:

$$S + U = 50$$

Now we can eliminate choices A and D since they do not include this equation. Next, we know that the standard rope costs \$2.50 per yard and the ultra-strength rope costs twice as much as that, so \$5. We can now create the final system of equations as follows:

$$\begin{aligned} S + U &= 50 \\ 2.50 + 5U &= 155 \end{aligned}$$

6. **D.** First, we must set up a system of equations. Let A represent the number of adults and C represent the number of children.

$$\begin{aligned} A + C &= 126 \\ 4A + 2C &= 408 \end{aligned}$$

Now we must solve for both of our variables. Let us first solve for the number of adults.

$$C = 126 - A$$

Substitute:

$$\begin{aligned} 4A + 2(126 - A) &= 408 \\ 4A + 252 - 2A &= 208 \\ 2A &= 156 \\ A &= 78 \text{ adults} \end{aligned}$$

Thus, if there are 78 adults, then there must be $126 - 78 = 48$ children.

7. **C.** First, let's set up a system of equations. Let H represent the number of hard stock and S represent the number of standard stock. Furthermore, we let x represent the rate of the standard stock.

$$\begin{aligned} H + S &= 500 \\ 1.45xH + xS &= 160 \end{aligned}$$

It is also stated in the problem that the company bought 300 sheets in standard and 200 in hard stock. We plug those values into our second equation to find the rates.

$$\begin{aligned} 1.45x(200) + x(300) &= 160 \\ 290x + 300x &= 160 \\ 590x &= 160 \\ x &\approx 0.27 \end{aligned}$$

The rate of standard stock is \$0.27. This means the price of hard stock is $0.27 \cdot 1.45 = \$0.39$.

8. **C.** Set up the system of equations. The dealership has 50 cars, so our first equation is as follows where X represents the number of tier 1 cars and Y represents the number of tier 2 cars.

$$X + Y = 50$$

Next, we know that tier 2 cars are 40% more pricey and the total price of the 50 cars is \$345,560.

$$17,400X + 24,360Y = \$345,560$$

9. **A.** Let X represent the hours driven from the north shore to the buoy and let Y represent the hours driven from the buoy to the south shore. We know that:

$$X + Y = 7$$

And we know the speeds as well as the total distance traveled.

$$90X + 120Y = 750$$

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10. **B.** We must set up two equations for the two yoga studios. X represents the number of months.

$$\text{Chakra Yoga} = 90 + 15X$$

$$\text{Tree Studio} = 30X$$

Now we set the equations equal to each other:

$$30X = 90 + 15X \quad 15X = 90 \quad X = 6 \text{ months}$$