



Grade 8 Mathematics EOG (GSE) Quiz Answer Key

Expressions and Equations - (MGSE8.EE.8c) Solve Problems Leading To 2 Linear Equations

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Score: _____

1) Casey is making a flower arrangement with roses(r) and carnations(c). The cost of each rose is \$0.50 and the cost of each carnation is \$0.10. The arrangement has a total of 80 flowers and the flower cost was \$20. How many of each flower did Casey put in her arrangement?

Which system of equations matches the situation?

A)
$$\begin{cases} r + c = 20 \\ .50r + .10c = 80 \end{cases}$$

B)
$$\begin{cases} r + c = 80 \\ .50r + .10c = 20 \end{cases}$$

C)
$$\begin{cases} r + c = .60 \\ .10r + .50c = 80 \end{cases}$$

D)
$$\begin{cases} r + c = 80 \\ 10r + 50c = 20 \end{cases}$$

Explanation:

The solution is **B**. Since there are a total of 80 flowers, we can set up one equation as $r + c = 80$. The other equation reflects the cost: $.50r + .10c = 20$.

2) At a high school football game Jamie buys 6 hot dogs and 4 soft drinks for \$13. Amy buys 3 hot dogs and 4 soft drinks for \$8.50. What is the price of a hot dog?

- A) \$0.75
 B) \$1.00
 C) \$1.25
 D) **\$1.50**

Explanation:

The correct answer is **\$1.50**. The following equations can be used to solve this problem:
 $6h + 4s = 13$ and $3h + 4s = 8.50$. The elimination method can then be used to solve for h .

3) Not including tax, 14 pieces of clothing cost \$107. Pants cost \$12.50 and shirts cost \$4.00. No other types of clothes were purchased. Which system of equations could be used to solve for the number of pants (p) and the number of shirts (s) bought?

A)
$$\begin{cases} p + s = 107 \\ 12.5p + 4s = 14 \end{cases}$$

B)
$$\begin{cases} p + s = 14 \\ 12.5p + 4s = 107 \end{cases}$$

C)
$$\begin{cases} p + s = 16.5 \\ 12.5p + 4s = 14 \end{cases}$$

$$D) \begin{cases} 16.5(p+s) = 14 \\ 12.5p+4s = 107 \end{cases}$$

Explanation:

The solution is **B**. The total number of pants and shirts equals 14. The cost of all the pants and shirts equals 107.

4) Not including tax, a total of 19 pens and markers cost \$11.50. The pens cost \$0.25 each, and the markers cost \$0.75 each. Which system of equations could be used to solve for the number of pens (p) and the number of markers (m) bought?

$$A) \begin{cases} p+m = 30.5 \\ 0.25p = 0.75m \end{cases}$$

$$B) \begin{cases} p+m = 19 \\ 0.25p+0.75m = 11.5 \end{cases}$$

$$C) \begin{cases} p+m = 11.5 \\ 0.25p+0.75m = 19 \end{cases}$$

$$D) \begin{cases} 19(p+m) = 1.00 \\ 0.25p+0.75m = 11.5 \end{cases}$$

Explanation:

The solution is **B**. The total number of pens and markers is 19. The cost of each item equals \$11.50

5) Sharon is making 100 liters of punch for a party. The punch contains ginger ale (g) and fruit juice (f). The cost of the ginger ale is \$1 per liter and the fruit juice is \$1.50 per liter. If Sharon spent a total of \$130, how many liters of each did she put in the punch?

Which system of equations matches the situation?

A)
$$\begin{cases} g + f = 130 \\ g + 1.5f = 100 \end{cases}$$

B)
$$\begin{cases} g + f = 100 \\ 1.5g + f = 130 \end{cases}$$

C)
$$\begin{cases} g + f = 100 \\ g + 1.5f = 130 \end{cases}$$

D)
$$\begin{cases} g + f = 230 \\ g + 1.5f = 100 \end{cases}$$

Explanation:

The solution is **C**. Since there are a total of 100 liters of punch, we can set up one equation $g + f = 100$. The other equation reflects the cost: $g + 1.5f = 130$.

6) Joyce wants to mix granola and raisins together to make a snack for her class. Granola costs \$2 per pound and raisins cost \$4.50 per pound. Joyce is willing to spend \$37.50 and wants to make 15 pounds of trail mix. Which system of equations could Joyce use to figure out how many pounds of granola (g) and raisins (r) she should buy?

A)
$$\begin{cases} g + r = 37.5 \\ 2g + 4.5r = 15 \end{cases}$$

B)
$$\begin{cases} g + r = 15 \\ 4.5g + 2r = 37.5 \end{cases}$$

C)
$$\begin{cases} g + r = 15 \\ 2g + 4.5r = 37.5 \end{cases}$$

D)
$$\begin{cases} 15(g + r) = 6.5 \\ 2g + 4.5r = 52.5 \end{cases}$$

Explanation:

The solution is **C**. The total pounds of granola and raisins is 15. The total cost of granola and raisins is \$37.50.

7) Shaun is 4 years older than her sister Charmaine. If the sum of their ages is 16 how old is Charmaine?

- A) 4 years old
- B) 6 years old**
- C) 8 years old
- D) 10 years old

Explanation:

The correct answer is **6 years old**. The following equations can be used to solve the system by substitution:

$$s + c = 16 \text{ and } s = c + 4.$$

8) Joshua is the place kicker for his college football team. Last season he kicked 42 times and never missed. Each field goal scored 3 points, and each extra point scored 1 point, for a total of 86 points.

How many field goals did Joshua kick?

- A) 19
- B) 20**

- C) 22
- D) 23

Explanation:

The solution is **22**. One equation must represent the number of kicks made by Joshua, $x + y = 42$. The other equation must represent the number of points earned, $3x + y = 86$. You may use any method of solving systems you would like, just make sure you find the value of **x**.

9)

Choice A: 3 nights and one meal for \$ 250
 Choice B: 3 nights and 6 meals for \$330

A motel offers the specials shown. What price is the motel charging per night?

- A) \$16
- B) \$19
- C) \$77
- D) \$78**

Explanation:

Let x represent the cost per night and y represent the cost per meal.

Choice (1) $\rightarrow 3x + y = 250$

Choice (2) $\rightarrow 3x + 6y = 330$

Use any method of solving systems to determine the value of x .

10) You are buying decorations for a birthday party. Six rolls of crepe paper and 20 balloons cost \$11.90. After you start decorating, you need more supplies. You buy 2 more rolls of crepe paper and 15 more balloons for \$6.05. How much did each roll of crepe paper cost?

- A) \$1.15**
- B) \$1.58
- C) 22.6¢
- D) 25¢

Explanation:

Let x represent the cost a roll crepe paper, y represents the cost of a balloon. The equation for the first trip is $6x + 20y = 11.90$ and the second trip is $2x + 15y = 6.05$. Use any method of solving systems to determine the value of x .

11) Marty made a \$220 bank deposit using \$10 bills and \$5 bills. She gave the teller a total of 38 bills, how many \$5 bills were in the deposit?

- A) 6 five-dollar bills
- B) 28 five-dollar bills
- C) 32 five-dollar bills**
- D) 34 five-dollar bills

Explanation:

32 five-dollar bills

Let t = number of \$10 bills

Let f = number of \$5 bills

Set up system of equations:

$$t + f = 38$$

$$10t + 5f = 220$$

Multiply first equation by -10 and use linear combination to solve the system:

$$-10t - 10f = -380$$

$$10t + 5f = 220$$

$$-5f = -160$$

$$f = 32$$

There were 32 five-dollar bills in the deposit.

12) Car rental agency A charges \$50 per day plus 10 cents per mile driven. Agency B charges \$20 per day plus 30 cents per mile driven. For a one-day rental it is cheaper to rent from agency A if you drive more than

- A) 50 miles.
- B) 100 miles.
- C) 125 miles
- D) 150 miles.**

Explanation:

150 miles. Setting $50 + 0.10x$ (the linear model for agency A) equal to $20 + 0.30x$ (the linear model for agency B) yields $x = 150$.

13) Rhianna invests \$1200 in stock and bonds. The stock pays 9% interest and the bonds pay 6% interest. If the total ANNUAL interest is \$96, how much is invested in the stock alone?

- A) \$400
- B) \$500
- C) \$700
- D) \$800**

Explanation:

The first equation represents the amount of money invested, $x + y = \$1200$. The second equation must result in the amount of interest earned $.06x + .09y = 96$. Before you start solving it might be a good idea to convert the second equation into an integral equation by multiplying all of the terms by 100 (it gets rid of the decimals). $6x + 9y = 9600$ from equation #1: $x = 1200 - y$. Now, substitute: $6(1200 - y) + 9y = 9600$; $7200 - 6y + 9y = 9600$; $2400 = 3y$; so, $y = 800$

14) Easy to Find, a computer data base, charges \$30/h during peak hours to access its records. The charge during off-peak hours is \$12/h. Indigo Research was billed \$876.00 last month for 40 hours of access time. Using a system of equations, find the number of hours charged for usage during peak times.

- A) 16 hours
- B) 18 hours
- C) 22 hours**
- D) 24 hours

Explanation:

22 hours

Let p = the number of hours at the peak rate

Let n = the number of hours at off peak rate

Set up system of equations:

$$\begin{aligned} p + n &= 40 \\ 30p + 12n &= 876 \end{aligned}$$

Solve system by linear combination.

Multiply first equation by -12.

$$\begin{aligned} -12p - 12n &= -480 \\ 30p + 12n &= 876 \\ 18p &= 396 \\ p &= \mathbf{22 \text{ hours}} \end{aligned}$$

15) A master electrician earns \$62 per hour. His apprentice earns \$40 per hour. The master electrician works 3 hours more than the apprentice. If together they are paid \$492, how much does the master electrician earn?

- A) \$292
- B) \$312
- C) \$332
- D) **\$372**

Explanation:

\$372

Let x = master electrician's hours

Let y = apprentice's hours

Since the master electrician worked 3 hours more than the apprentice, $x - 3 = y$.

Set up the system of equations.

$$x - 3 = y$$

$$62x + 40y = 492$$

In the second equation, substitute $x - 3$ in for y and solve for x (hours worked by master electrician).

$$62x + 40(x - 3) = 492$$

$$62x + 40x - 120 = 492$$

$$102x = 612$$

$$x = 6 \text{ hours}$$

Multiply 6 by the hourly rate of \$62.

The master electrician earns \$372.

16) A weather plane took to the skies to measure the speed of the jet stream. The plane flew 1920 km with the jet stream as a tail wind. Then, it returned to its original location. The eastbound flight took 2 hours, and the westbound flight took 3.2 hours.

Which system of equations can be used to find the speed of the jet stream and the speed of the plane? What was the speed of the jet stream? (p = plane, w = wind)

- A) $p + w = 960$; $p - w = 600$; jet stream's speed = 180 km/h
- B) $p + w = 960$; $p - w = 500$; jet stream's speed = 180 km/h
- C) $p - w = 960$; $p + w = 600$; jet stream's speed = 200 km/h
- D) $p + w = 960$; $p - w = 600$; jet stream's speed = 160 km/h

Explanation:

$p + w = 960$; $p - w = 600$; plane's speed = 780km/h; wind speed = 180 km/h

Let p = plane's speed

Let w = jet stream's speed

$p + w$ = eastbound with wind

$p - w$ = westbound against wind

Set up system of equations using $d = rt$ for eastbound and westbound flights. The distance will be the same for going and coming.

$$2(p + w) = 1920$$

$$3.2(p - w) = 1920$$

Simplify the first equation by dividing both sides by 2. Simplify the second equation by dividing both sides by 3.2.

Rewrite the equations:

$$p + w = 960$$

$$p - w = 600$$

Solve for p : $p = 780$

Substitute to find w : $w = 180$

The jet stream's speed was 180 km/h

17) The value p (price) at which the supply of a crop equals the demand for that crop is called the equilibrium price. The equation for the supply of soy beans is $S = 0.3p + 3$. The equation for the demand of soybeans is $D = -0.5p + 9$. Determine the equilibrium price.

- A) \$6.50
- B) \$6.75
- C) \$7.00
- D) **\$7.50**

Explanation:

\$7.50

Since the equilibrium price occurs when the supply and demand for soybeans are equal, $S = D$.

Substitute the equations in for S and D .

$$0.3p + 3 = -0.5p + 9.$$

Solve for p .

$$p = \$7.50$$

The equilibrium price is \$7.50.