Answer

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

Answer Key

1. **B.** In this problem we will use substitution to solve the system of equations. First, we will isolate the x-value in the first equation $2x - 4y = -8 \rightarrow x - 2y = -4 \rightarrow x = 2y - 4$. We will then plug this *x*-value into the second equation to find our *y*-value:

$$\begin{aligned} 4x - 2y &= -16 \\ 2x - y &= -8 \\ 2(2y - 4) - y &= -8 \\ 4y - 8 - y &= -8 \\ 3y &= 0 \\ y &= 0 \end{aligned}$$

Knowing that our *y*-value is zero we can solve for our *x*-value:

$$\begin{aligned} 2x - 4(0) &= -8 \\ 2x &= -8 \\ x &= -4 \end{aligned}$$

Therefore, the value of $x + y$ is equal to -4 which makes answer choice (B) correct.

2. **C**. For this problem we will isolate the *x*-value in the second equation

$$\begin{aligned} x + 6y &= 3 \\ x &= 3 - 6y \end{aligned}$$

Then we will substitute this into our first equation to find our *y*-value

$$\begin{aligned} 3x - y &= 2y + 2 \\ 3x &= 3y + 2 \\ 3(3 - 6y) &= 3y + 2 \\ 9 - 18y &= 3y + 2 \\ 7 &= 21y \\ y &= \frac{1}{3} \end{aligned}$$

Knowing that our *y*-value is $\frac{1}{3}$ we can solve for our *x*-value:

$$\begin{aligned} x + 6y &= 3 \\ x + 6\left(\frac{1}{3}\right) &= 3 \\ x + 2 &= 3 \\ x &= 1 \end{aligned}$$

Therefore, the value of $x \times y = \left(\frac{1}{3}\right)(1) = \frac{1}{3}$ which makes answer choice (C) correct.

3. **D.** In this problem, we will use elimination to solve the system of equations. First, we will add the two linear equations together cancelling out the *y*-value

$$\begin{array}{r} (5x+2y=6) \\ \underline{+(4x-2y=12)} \\ 9x=18 \\ x=2 \end{array}$$

Knowing that our *x*-value is 2 we can solve for our *y*-value

$$\begin{aligned} 5x+2y&=6 \\ 5(2)+2y&=6 \\ 2y&=-4 \\ y&=-2 \end{aligned}$$

Therefore, the value of $x-y=2-(-2)=4$ which makes answer choice (D) correct.

4. **D.** Here we have two obscure linear equations that can be simplified

$36x-9y=108 \to 4x-y=12$

$14x-7y=28 \to 2x-y=4$

Now we can isolate our *y*-value in our second equation

$2x-y=4 \to y=2x-4 \to 4x-(2x-4)=12 \to 2x=8 \to x=4$

Knowing that our *x*-value is 4 we can solve for our *y*-value

$2x-y=4 \to 2(4)-y=4 \to y=4$

Therefore, the value of $x+y=(4)+(4)=8$

5. **C.** In this problem we will use substitution to solve the system of equations. First, we will isolate the *y*-value in the second equation $5y=4x \to y=\frac{4}{5}x$. We will then plug this *y*-value into the first equation to find our *x*-value.

$3y=\frac{4}{3}-\frac{x}{3} \to 3\left(\frac{4}{5}x\right)=\frac{4}{3}-\frac{x}{3} \to \frac{12}{5}x=\frac{4}{3}-\frac{x}{3} \to \frac{36}{15}x+\frac{5}{15}x=\frac{20}{15} \to \frac{41}{15}x=\frac{20}{15} \to x=\frac{20}{41}$

Knowing that our *x*-value is $\frac{20}{41}$ we can solve for our *y*-value:

$5y=4x \to y=\frac{4}{5}\left(\frac{20}{41}\right)=\frac{80}{205}=\frac{16}{41}$.

Now that we have our *x* and *y-values* the question is asking for the dividend of our *x* and *y*-values.

$\frac{x}{y}=\frac{\frac{20}{41}}{\frac{16}{41}}=\frac{20}{41}\times\frac{41}{16}=\frac{20}{16}$ which means answer choice (C) is correct.

6. **D.** Here we are only asked to find the *x*-value of the systems of equations; therefore, we will isolate the *y*-value in this first equation to find our *x*-value.

$-x+y=-2.5 \to y=x-2.5$

Now we can substitute our *y*in the second equation to find our *x*-value.

$x+3y=10.5 \to x+3(x-2.5)=10.5 \to x+3x-7.5=10.5 \to 4x=18 \to x=4.5$

Knowing that our *x*-value is 4.5 answer choice (D) is correct.

7. **A**. For this problem, we are presented with an isolated x-value in the first equation; therefore, we will simplify and substitute to solve for our y-value. $2x = 2y - 6 \rightarrow x = y - 3$. Now we can substitute our x-value into the second equation to find our y-value.
$(y-3) + 4y = 12 \rightarrow 5y = 15 \rightarrow y = 3$. Knowing that our y-value is 3 we can substitute this value into our first equation to get an x-value. $2x = 2(3) - 6 \rightarrow x = 0$. Therefore, the ordered pair (x, y) that satisfies the system of equations is $(0,3)$ which means answer choice (A) is correct.

8. **B**. Here we have a problem testing our knowledge of systems of equations with infinitely many solutions. When a system of equations has infinitely many solutions the two lines are exactly the same; therefore, we can multiply our first equation in order to align our y-intercepts. $ax + by = 14 \rightarrow 5ax + 5by = 70$. Now we know that a and b are constants, and we also know that our equations must match therefore we can set the x-values and y-values equal to each other in order to get the values of a and b. $5ax = 3x \rightarrow a = \frac{3}{5}$
$5by = 5y \rightarrow b = 1$. Knowing that our a and b values are $\frac{3}{5}$ and 1 respectively we can now solve for the dividend of $\frac{a}{b} = \frac{\frac{3}{5}}{1} = \frac{3}{5}$ which means answer choice (B) is correct.

9. **D**. Here we have a problem that is testing our knowledge on the systems of equations with no solutions. When a system of equations has no solutions the two lines must be parallel and never intersect, which means they have the same slope, but different y-intercepts. Therefore, we will put the two equations in slope-intercept form $3x + 6y = 10 \rightarrow y = -\frac{1}{2}x + \frac{5}{3}$ and $6x + cy = 12 \rightarrow y = -\frac{6}{c}x + 12$. Looking at the two equations in order for them to be parallel our value of c must equal 12 which means answer choice (D) is correct.

10. **C.** Here we have a problem testing our knowledge of systems of equations with infinitely many solutions. When a system of equations has infinitely many solutions the two lines are exactly the same; therefore, we can multiply our first equation in order to align our y-intercepts. $cx + 3y = 24 \rightarrow 4cx + 12y = 72$. Furthermore, we can put both equations into slope-intercept form in order to determine the slope.
$192x + 64y = 384 \rightarrow y = -3x + 6$ and $4cx + 12y = 72 \rightarrow y = -\frac{4c}{12}x + \frac{72}{12} \rightarrow y = -\frac{4c}{12}x + 6$. In order to make these lines exactly the same our c-value must equal 9 which makes answer choice (C) correct.