What is the solution to the system of equations shown in the graph?

A) (0, 5)  
B) (-2, 1)  
C) (0, -1)  
D) (1, -2)

Explanation:  
The graphed lines intersect at (-2, 1).
2) A system of linear equations has been graphed in the diagram. Determine a reasonable solution for the system of equations.

A) (3, 0)  
B) (0, 3)  
C) (4, 0)  
D) (0, -3)

Explanation:  
The solution is (0, -3). Because the lines intersect on the y-axis below the origin, we know that the solution point must be (0, -#). Therefore, a reasonable solution for the system is (0, -3).

3) A system of linear equations has been graphed in the diagram. Determine a reasonable solution for the system of equations.

A) (1, 4)  
B) (-1, 4)  
C) (1, -4)  
D) (-1, -4)

Explanation:  
The solution is (-1, -4). Because the lines cross in Quadrant III, we know that the solution point must be (-, -). Therefore, a reasonable solution for the system is (-1, -4).
A system of linear equations has been graphed in the diagram. Determine a reasonable solution for the system of equations.

A) (2, 1)
B) (-2, 1)
C) (2, -1)
D) (3, -1)

**Explanation:**
The solution is (2, 1). Because the lines cross in Quadrant I, we know that the solution point must be (+, +). Therefore, a reasonable solution for the system is (2, 1).
What is the solution to system of linear equations graphed here?

A) (0,1)
B) (1,-1)
C) (0,-3)
D) (-1,1)

**Explanation:**
The solution to the system of equations graphed above is (1,-1). The graphic solution of a system of equations is the point of intersection.
A system of linear equations has been graphed in the diagram. Determine a reasonable solution for the system of equations.

A) (2, 3)
B) (-2, 3)
C) (2, -3)
D) (-2, -3)

**Explanation:**
The solution is (-2, 3). Because the lines cross in Quadrant II, we know that the solution point must be (-, +). Therefore, a reasonable solution for the system is (-2, 3).

7)

\[
a + b = 10 \\
a - b = 2
\]

Solve the system of equations.

A) \(a = 5, b = 5\)
B) \(a = 2, b = 8\)
C) \(a = 6, b = 4\)
D) \(a = 3, b = 7\)

**Explanation:**
\(a = 6, b = 4\) Use elimination:
\[
a + b = 10 \\
+ a - b = 2
\]

\(2a = 12; a = 6\). Then plug in to find b.

\(6 + b = 10; b = 4\).
Identify the solution for the system of equations graphed here.

A) (1, 1)
B) (-1, 1)
C) (1, -1)
D) (-1, -1)

Explanation:
The solution is (1, -1). The lines intersect at the point (1, -1).
A system of linear equations has been graphed in the diagram. Determine a reasonable solution for the system of equations.

9) A) (2, -1)  
   B) (-1, 2)  
   C) (-2, 1)  
   D) (0, -2)

Explanation:  
The solution is (2, -1). By looking at the graph you can see that the lines intersect in quadrant IV. Since the point is to the right of the origin, we know that the x-coordinate is positive. Since the intersection point is below the x-axis, we know that the y-coordinate is negative.

10) Solve the system of equations.
   A) x = 6, y = 3  
   B) x = 6, y = 13  
   C) x = 3, y = 6  
   D) x = 1, y = 0

Explanation:  
The solution is x = 3, y = 6. You can solve the system by eliminating one of the variables.

\[
\begin{align*}
5x - 2y &= 3 \\
-5x + 4y &= 9
\end{align*}
\]

\[
\begin{align*}
2y &= 12 \\
y &= 6
\end{align*}
\]

Then substitute 6 into one of the equations.

\[
\begin{align*}
5x - 2(6) &= 3 \\
5x &= 15 \\
x &= 3
\end{align*}
\]
11)

Solve the system of equations.

A) \( x = 2, y = -1 \)
B) \( x = -1, y = 2 \)
C) \( x = -\frac{1}{2}, y = 3 \)
D) \( x = 3, y = -\frac{1}{2} \)

**Explanation:**
The solution is \( x = 2, y = -1 \). You can solve the system by subtracting the 2nd equation from the 1st.

\[
\begin{align*}
6x + 3y &= 9 \\
2x + 3y &= 1
\end{align*}
\]
\[
\begin{align*}
4x &= 8 \\
x &= 2
\end{align*}
\]

Then substitute 2 into one of the equations.

\[
\begin{align*}
6(2) + 3y &= 9 \\
3y &= -3 \\
y &= -1
\end{align*}
\]

12)

Solve the system of equations.

A) \( x = 4, y = 1 \)
B) \( x = 1, y = 4 \)
C) \( x = -\frac{2}{3}, y = 3 \)
D) \( x = 3, y = -\frac{2}{3} \)

**Explanation:**
The solution is \( x = 4, y = -1 \). You can solve the system by eliminating one of the variables.

\[
\begin{align*}
x + 3y &= 7 \\
x - 3y &= 1
\end{align*}
\]
\[
\begin{align*}
2x &= 8 \\
x &= 4
\end{align*}
\]

Then substitute 4 into one of the equations.

\[
\begin{align*}
4 - 3y &= 1 \\
-3y &= -3 \\
y &= 1
\end{align*}
\]
Kayla is running for charity. Her dad pledges to give her $0.50 per mile she runs. Her mom pledges to give her a flat donation of $5. How many miles will Kayla have to run to get the same donation from both parents?

You write two equations $d = 0.5m$ and $d = 5$ and graph the lines. What does the graph tell you that the answer is?

A) She will have to run 5 miles.
B) She will have to run 6 miles.
C) **She will have to run 10 miles.**
D) She will have to run 15 miles.

**Explanation:**
The graph shows that the answer to the system of equations is (10,5). From the equations, we know that the donation is 5 and the mileage is 10. **She will have to run 10 miles** for the donations to be equal.
15)

Which point is the solution to the system of equations graphed?

A) (-3, -3)
B) (0, 6)
C) (3, 3)
D) (6, 0)

**Explanation:**
The solution to a system of equations is the point where the lines intersect. These lines intersect at the point (3, 3).

15) \[ \begin{align*}
    x &= y - 3 \\
    x + 3y &= 13
\end{align*} \]

What is the solution to the system of equations?

A) (1, 4)
B) (4, 1)
C) (7, 4)
D) (2.5, 5.5)

**Explanation:**
Although you may choose any method to solve this system, because one equation has an isolated variable \((x = y - 3)\), it would be easier to use substitution. Substitute \(y - 3\) in for \(x\) in \(x + 3y = 13\) resulting in \((y - 3) + 3y = 13\). Solve for \(y\) and then substitute the answer for \(y\) back into \(x = y - 3\) to find \(x\).

16)

\[ \begin{align*}
    2x - y &= 5 \\
    3x + 2y &= 4
\end{align*} \]

Solve the system of equations.

A) (3, 1)
B) (0, 2)
C) (2, -1)
D) \left( \frac{9}{7}, \frac{17}{7} \right)

**Explanation:**
The solution is \((2, -1)\). Solving using linear combination...
Multiply the first equation by 2 so that you get \(4x - 2y = 10\) then stack the equations on top of each other and add the like terms vertically. The result will be \(7x = 14\), and \(x = 2\). Substitute \(x\) in either original equation to find \(y\) (\(y = -1\)).
17) \[
\begin{align*}
  x + 2y &= 3 \\
  3x - 2y &= 5
\end{align*}
\]
What is the solution to the system of equations?
A) \((4, 3.5)\)
B) \((2, \frac{1}{2})\)
C) \((2, -1)\)
D) \((\frac{1}{2}, 2)\)

**Explanation:**
The solution is \((2, \frac{1}{2})\). Since the \(y\)-terms are opposites, it is best to use linear combination to eliminate a variable.
\[
\begin{align*}
  x + 2y &= 3 \\
  3x - 2y &= 5
\end{align*}
\]
\[4x = 8\] and thus \(x = 2\). Substitute this value into one of the equations and you will find that \(y = \frac{1}{2}\).

18) \[
\begin{align*}
  2x - 3y &= 16 \\
  3x + 2y &= 11
\end{align*}
\]
Solve the system of equations.
A) \((15 \frac{1}{2}, 5)\)
B) \((5, -2)\)
C) \((5, 4)\)
D) \((-1, -6)\)

**Explanation:**
The correct answer is \((5, -2)\). Use elimination: subtract the two equations after multiplying the top equation by 3 and the bottom equation for 2:
\[
\begin{align*}
  6x - 9y &= 48 \\
  -6x + 4y &= 22
\end{align*}
\]
\[-13y = 26; y = -2\] Then plug in to solve for \(x\).
\[2x - 3(-2) = 16; 2x = 10; x = 5\]

19) What is the solution to the system of equations?
\[
\begin{align*}
  6x - 9y &= 16 \\
  2x - 3y &= 7
\end{align*}
\]
A) \((5, 1)\)
B) \((2, -1)\)
C) \((3, \frac{2}{9})\)
D) no solution

**Explanation:**
The graphs of these equations are parallel lines and share no common points, so the solution to this system is no solution.
20) Solve this system of equations for \(a\) and \(b\).

\[
\begin{align*}
a + 2b &= 10 \quad (1) \\
2a + b &= 6 \quad (2)
\end{align*}
\]

- **A)** \(a = \frac{102}{5}, b = 13\)
- **B)** \(a = \frac{14}{3}, b = \frac{8}{3}\)
- **C)** \(a = \frac{2}{3}, b = \frac{14}{3}\)
- **D)** \(a = -\frac{2}{5}, b = \frac{34}{5}\)

**Explanation:**
To solve this, solve equation 1 for \(a\): \(a = 10 - 2b\), then, substitute this equation into the second equation: \(2(10 - 2b) + b = 6\) or \(20 - 4b + b = 6\), \(20 - 3b = 6\), \(-3b = -14\), so \(b = -14/-3 = \frac{14}{3}\). Then plug this value into back into either equation and solve for \(b\). \(2a + \frac{14}{3} = 6\), so \(2a = 6 - \frac{14}{3} = \frac{6}{3} - \frac{14}{3} = \frac{6 - 14}{3} = \frac{-8}{3}\), so \(a = \frac{-8}{3}/2 = \frac{-4}{3}\). You should probably save a problem like this one until one of the last problems, since it takes the most time.

21) Solve the system of equations.

\[
\begin{align*}
3x + 5y &= 9 \quad (1) \\
3x + 2y &= 3 \quad (2)
\end{align*}
\]

- **A)** \(x = 2, y = 3\)
- **B)** \(x = 3, y = 2\)
- **C)** \(x = -\frac{1}{3}, y = 2\)
- **D)** \(x = 2, y = -\frac{1}{3}\)

**Explanation:**
The solution is \(x = -\frac{1}{3}, y = 2\). You can solve the system by subtracting the 2nd equation from the 1st.

\[
\begin{align*}
3x + 5y &= 9 \\
3x + 2y &= 3 \\
---------------
3y &= 6 \\
y &= 2
\end{align*}
\]
Then substitute 2 into one of the equations.

\[
\begin{align*}
3x + 2(2) &= 3 \\
3x &= -1 \\
x &= -\frac{1}{3}
\end{align*}
\]
22) Solve the system of equations using substitution.

A) (2,8)  
B) (2,-8)  
C) (10,24)  
D) no solution

Explanation:
Plug $2x + 4$ in for $y$ in the equation $2x - y = 6$. Don’t forget to distribute. When you do this, the x’s cancel out and you are left with $-4 = 6$. Since this is a false statement, the answer is no solution.

23) Joey has to solve the system of equations using substitution. He has completed the work shown. What should be his next step?

A) Nothing, he is done.  
B) He needs to write his solution as an ordered pair $(0, 2)$. 

$$\left\{ \begin{array}{l} 3x + 6y = 12 \\ x + 5y = 10 \end{array} \right.$$  

$x = 10 - 5y$

$3(10 - 5y) + 6y = 12$

$30 - 15y + 6y = 12$

$30 - 9y = 12$

$-9y = -18$

$y = 2$
C) He needs to plug back into one of the equations to find \( x \).
D) He needs to check his work to make sure he made no mistakes.

**Explanation:**
He has used substitution to find the value of \( y \) but he **needs to plug back into one of the equations to find \( x \)**. To solve a system of equations you need to know the values of both \( x \) and \( y \).

24)

![Graph of two lines intersecting at (1, 8)](image)

Solve the system of equations \( y = x + 7 \) and \( 2x + y = 10 \) using a graphical method.
A) (0, 5)
B) (1, 8)
C) (8, 1)
D) (17, 24)

**Explanation:**
The solution to the system is where the graphs of the two lines intersect. They intersect at the point \( (1, 8) \).

25)

\[
\begin{align*}
x + 2y &= 10 \\
3x + 4y &= 8
\end{align*}
\]

Which point is the solution to the system of equations?
A) (7, 1.5)
B) (11, -12)
C) (-11, -12)
D) (-12, 11)

**Explanation:**
The solution to the system is \( (-12, 11) \). This system can be solved algebraically by the substitution method. solve the first equation for \( x \) and substitute that into the second equation.

\[ x = 10 - 2y; \]
3(10 - 2y) + 4y = 8; 30 -6y +4y = 8; 30 - 2y = 8; -2y = -22; y = 11.

Then substitute 11 in for y in either equation to find x. x = 10 - 2(11); x = 10 -22; x = -12.
26) 

\[
\begin{align*}
2x - 3y &= 16 \\
5x - 3y &= 13 
\end{align*}
\]

Solve the system of equations.

A) (-1, -6)  
B) (-6, -1)  
C) (1, -\frac{14}{3})  
D) (5, -2)  

**Explanation:**  
The correct answer is (-1, -6). Use elimination: subtract the two equations:

\[
\begin{align*}
2x - 3y &= 16 \\
- (5x - 3y &= 13) 
\end{align*}
\]

-3x = 3; x = -1. Then plug in to solve for y. 2(-1) - 3y = 16; -3y = 18; y = -6

27) 

\[
\begin{align*}
3x + 2y &= 2 \\
-2x + y &= 8 
\end{align*}
\]

Solve the system of equations.

A) (-2, 4)  
B) (4, -2)  
C) (-4, -2)  
D) \(\left(\frac{5}{4}, -\frac{1}{2}\right)\)  

**Explanation:**  
The solution is (-2, 4). You can solve the system algebraically using substitution. Solve the second equation for a and substitute that into the first equation.

y = 2x + 8  

3x + 2(2x + 8) = 2; 3x + 4x + 16 = 2; 7x + 16 = 2; 7x = -14; x = -2.  

Then plug in x to solve for y.

28) 

\[
\begin{align*}
x &= 3y - 6 \\
2x - 4y &= 8 
\end{align*}
\]

Solve the system of equations using substitution.

A) (-12, -2)  
B) (15, 7)  
C) (21, 9)  
D) (24, 10)  

**Explanation:**  
Since x = 3y - 6, substitute 3y - 6 in for x in the equation 2x - 4y = 8. Solve for y and you should get y = 10. Plug 10 into the y in the equation x = 3y - 6. You should get x = 24. The answer is (24, 10).
29) Solve the system of equations using substitution.

A) (-2,-4)  
B) (-2,0)  
C) (-6,-4)  
D) (-6,8)

**Explanation:**
Plug \( x + 2 \) in for \( y \) in the equation \( 2x - y = -4 \) to get \( 2x - (x + 2) = -4 \). Don't forget to distribute the negative. When you solve, you should get \( x = -2 \). Plug \(-2\) back into the equation \( y = x + 2 \). When you do this you should get \( y = 0 \). The answer is \((-2,0)\).

30) Solve the system of equations.

A) (-2,-2)  
B) (2,-2)  
C) (2.5,1.75)  
D) (2,2)

**Explanation:**
Since the \( y \)'s already have different signs, you can multiply the top equation by 2 and eliminate the \( y \)'s. You may instead multiply the bottom equation by -3 and eliminate the \( x \)'s. Either way, solve for the variable that is left. Plug that answer back into either equation and solve for the other variable. The answer is \((2,2)\).