

Determine whether the ordered pair is a solution to the system. Show your work and CIRCLE YES or NO.

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| $\begin{cases} x - y = 5 \\ 4x - 2y = 16 \end{cases}$ | 1. (3,-2) YES or NO $\begin{array}{r} 3 - (-2) = 5 \\ 3 + 2 = 5 \\ 5 = 5 \\ \text{TRUE} \end{array}$ | $\begin{array}{r} 4(3) - 2(-2) = 16 \\ 12 + 4 = 16 \\ 16 = 16 \\ \text{TRUE} \end{array}$ | 2. (8,3) YES or NO $\begin{array}{r} 8 - 3 = 5 \\ 5 = 5 \\ \text{TRUE} \end{array}$ | $\begin{array}{r} 4(8) - 2(3) = 16 \\ 32 - 6 = 16 \\ 26 \neq 16 \\ \text{FALSE} \end{array}$ |
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Solve each linear system by graphing, substitution, or by elimination. Check your answer by substituting the values back into the equation. Show all work.

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| <p>3. Graph and Check</p> $\begin{cases} y = 2x - 4 \\ y = -\frac{1}{2}x + 1 \end{cases}$ <p>Y-INT = -4 SLOPE = 2</p> <p>Y-INT = 1 SLOPE = -1/2</p> <p>check: $0 = 2(2) - 4$ $0 = 4 - 4$ TRUE $0 = -\frac{1}{2}(2) + 1$ $0 = -1 + 1$ TRUE</p> <p>Solution: $(2, 0)$</p> | <p>4. Substitution</p> $\begin{cases} 3x + y = 3 \\ 7x + 2y = 1 \end{cases}$ <p>ISOLATE Y</p> $\begin{array}{r} 3x + y = 3 \\ -3x \quad -3x \\ \hline y = -3x + 3 \end{array}$ <p>SUBSTITUTE INTO OTHER EQUATION</p> $7x + 2(-3x + 3) = 1$ <p>COMBINING LIKE TERMS</p> $7x - 6x + 6 = 1$ $x + 6 = 1$ $\begin{array}{r} x + 6 = 1 \\ -6 \quad -6 \\ \hline x = -5 \end{array}$ <p>PLUG BACK INTO ORIGINAL EQUATION</p> $\begin{array}{r} 3(-5) + y = 3 \\ -15 + y = 3 \\ +15 \quad +15 \\ \hline y = 18 \end{array}$ <p>CHECK:</p> $\begin{array}{r} 3(-5) + 18 = 3 \\ -15 + 18 = 3 \\ \text{TRUE} \\ 7(-5) + 2(18) = 1 \\ -35 + 36 = 1 \\ \text{TRUE} \end{array}$ <p>Solution: $(-5, 18)$</p> | <p>5. Linear Combination</p> $\begin{cases} x + 2y = 1 \\ 5x + 3y = -23 \end{cases}$ <p>MULTIPLY TOP EQ. BY -5</p> $\begin{array}{r} -5(x + 2y) = -5(1) \\ -5x - 10y = -5 \\ + \quad 5x + 3y = -23 \\ \hline -7y = -28 \\ \div -7 \quad \div -7 \\ y = 4 \end{array}$ <p>PLUG BACK INTO ORIG. EQUATION</p> $\begin{array}{r} x + 2(4) = 1 \\ x + 8 = 1 \\ -8 \quad -8 \\ \hline x = -7 \end{array}$ <p>CHECK:</p> $\begin{array}{r} -7 + 2(4) = 1 \\ -7 + 8 = 1 \\ \text{TRUE} \\ 5(-7) + 3(4) = -23 \\ -35 + 12 = -23 \\ \text{TRUE} \end{array}$ <p>Solution: $(-7, 4)$</p> |
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Solve the linear systems by the method of your choice.

6.
$$\begin{cases} -6x - 4y = -30 \\ y = 3x + 3 \end{cases}$$
 (USING SUBSTITUTION)

$$-6x - 4(3x + 3) = -30$$

$$-6x - 12x - 12 = -30$$

$$\begin{array}{r} -18x - 12 = -30 \\ +12 \quad +12 \\ \hline -18x = -18 \end{array}$$

$$\begin{array}{r} -18x = -18 \\ -18 \quad -18 \\ \hline x = 1 \end{array}$$

$$y = 3(1) + 3$$

$$y = 3 + 3$$

$$y = 6$$

CHECK:

$$-6(1) - 4(6) = -30$$

$$-6 - 24 = -30$$

TRUE

$$6 = 3(1) + 3$$

$$6 = 3 + 3$$

TRUE

Solution:

$$(1, 6)$$

7.
$$\begin{cases} x + y = 3 \\ x + 2y = 6 \end{cases}$$
 (USING COMBINATION)

$$-1(x + y = 3)$$

$$-x - y = -3$$

$$x + 2y = 6$$

$$y = 3$$

$$\begin{array}{r} x + 3 = 3 \\ -3 \quad -3 \\ \hline x = 0 \end{array}$$

CHECK:

$$0 + 3 = 3$$

TRUE

$$0 + 2(3) = 6$$

TRUE

Solution:

$$(0, 3)$$

8.
$$\begin{cases} y + 3x = 9 \\ 3y + 2x = -1 \end{cases}$$
 (USING SUBSTITUTION)

$$\begin{array}{r} y + 3x = 9 \\ -3x \quad -3x \\ \hline y = 3x + 9 \end{array}$$

$$y = 3x + 9$$

$$3(-3x + 9) + 2x = -1$$

$$-9x + 27 + 2x = -1$$

$$\begin{array}{r} -7x + 27 = -1 \\ -27 \quad -27 \\ \hline -7x = -28 \end{array}$$

$$\begin{array}{r} -7x = -28 \\ -7 \quad -7 \\ \hline x = 4 \end{array}$$

$$y + 3(4) = 9$$

$$y + 12 = 9$$

$$\begin{array}{r} y + 12 = 9 \\ -12 \quad -12 \\ \hline y = -3 \end{array}$$

CHECK:

$$-3 + 3(4) = 9$$

$$-3 + 12 = 9$$

TRUE

$$3(-3) + 2(4) = -1$$

$$-9 + 8 = -1$$

TRUE

Solution:

$$(4, -3)$$

9.
$$\begin{cases} -4x + 3y = -17 \\ 8x - 5y = 39 \end{cases}$$
 (USING COMBINATION)

$$2(-4x + 3y = -17)$$

$$-8x + 6y = -34$$

$$+ \begin{array}{r} 8x - 5y = 39 \\ \hline \end{array}$$

$$y = 5$$

$$8x - 5(5) = 39$$

$$8x - 25 = 39$$

$$+25 \quad +25$$

$$8x = 64$$

$$x = 8$$

CHECK:

$$-4(8) + 3(5) = -17$$

$$-32 + 15 = -17$$

$$-17 = -17$$

TRUE

$$8(8) - 5(5) = 39$$

$$64 - 25 = 39$$

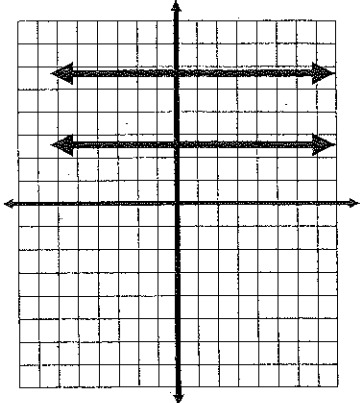
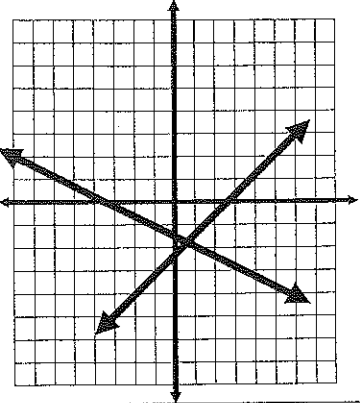
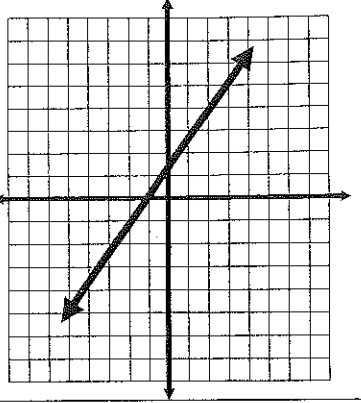
$$39 = 39$$

TRUE

Solution:

$$(8, 5)$$

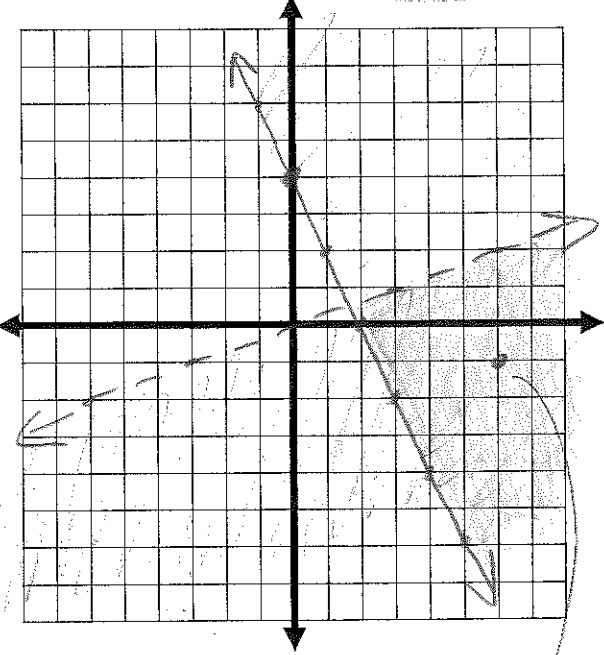
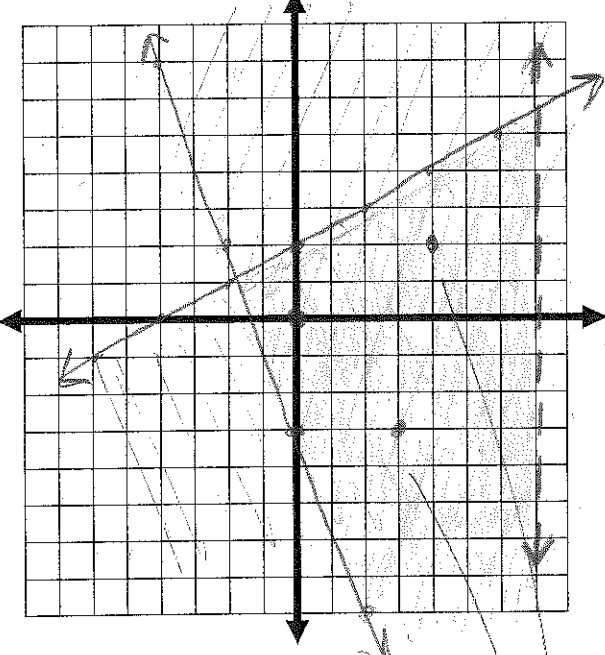
10. How many solutions for each graph?

| PARALLEL | INTERSECTING | COINCIDING |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |  |
| Number of solutions: NONE | Number of solutions: ONE | Number of solutions: INFINITELY MANY |

SOLVING THE SYSTEM RESULTS IN A FALSE STATEMENT

SOLVING THE SYSTEM RESULTS IN A TRUE STATEMENT

Solve the systems of linear inequalities by graphing. SHOW THE SOLUTION CLEARLY BY SHADING THE REGION DARKER THAN OTHER AREAS ON THE GRAPH.

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| 11. $y < \frac{1}{3}x$ ← Y-INT = 0 SLOPE = $\frac{1}{3}$ (DASHED) $y \geq -2x + 4$ ← Y-INT = 4 SLOPE = $-\frac{2}{1}$ (SOLID) | 12. $y \leq \frac{1}{2}x + 2$ ← Y-INT = 2 SLOPE = $\frac{1}{2}$ (SOLID) $y \geq -\frac{5}{2}x - 3$ ← Y-INT = -3 SLOPE = $-\frac{5}{2}$ (SOLID) $x < 7$ VERTICAL (DASHED) |
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What is an example of a solution? $(6, -1)$

What is an example of a solution? $(4, 2)$
 $(3, -3)$
 $(0, 0)$

Create a system of two equations such that the following point is a solution.

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| <p>13. (3,5) $x=3$ HOT DOGS @ \$2 = \$6 $y=5$ BURGERS @ \$5 = \$25 <u>\$31</u></p> <p>$x+y=8$ $2x+5y=31$</p> | <p>14. (1,3) $x=1$ WIN @ 3 points = 3 points $y=3$ TIES @ 1 point = 3 points <u>6 points total</u> <u>4 games total</u></p> <p>$x+y=4$ $3x+1y=6$</p> |
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At what point do the following lines intersect?

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| <p>15. $x=3$ and $y=5$</p> <p>(VERT) (HORIZ) <p>(3,5)</p> </p> | <p>16. $y=7$ and $x=-12$</p> <p>(HORIZ) (VERT) <p>(-12,7)</p> </p> |
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Solve the linear systems by linear combination OR substitution.

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| <p>17. $\begin{cases} 3x+y=-1 \\ -9x-3y=3 \end{cases}$</p> <p>$y=-3x-1$ $y=-3x-1$</p> <p>SAME LINE (COINCIDING)</p> <p>$-9x-3(-3x-1)=3$ $-9x+9x+3=3$ $3=3$ TRUE</p> <p>INFINITELY MANY SOLUTIONS</p> | <p>18. $\begin{cases} x-2y=5 \\ -2x+4y=2 \end{cases}$</p> <p>$y=\frac{1}{2}x-\frac{5}{2}$ $y=\frac{1}{2}x+\frac{1}{2}$</p> <p>PARALLEL LINES</p> <p>$2x-4y=10$ $-2x+4y=2$ <u>$0=12$</u></p> <p>FALSE</p> <p>NO SOLUTION</p> |
| <p>19. $\begin{cases} -6x+2y=4 \\ -9x+3y=12 \end{cases}$</p> <p>$y=3x+2$ $y=3x+4$</p> <p>PARALLEL LINES</p> <p>$18x-6y=-12$ $-18x+6y=24$ <u>$0=12$</u> FALSE</p> <p>NO SOLUTION</p> | <p>20. $\begin{cases} 2x+y=5 \\ -6x-3y=-15 \end{cases}$</p> <p>$y=-2x+5$ $y=-2x+5$</p> <p>SAME LINE (COINCIDING)</p> <p>$6x+3y=15$ $-6x-3y=-15$ <u>$0=0$</u> TRUE</p> <p>INFINITELY MANY SOLUTIONS</p> |