

Algebra 1 Final Exam Review

Tell whether the ordered pair is a solution of the linear system

1. No
 $(0, -4);$
 $4x - y = 10$

$$\begin{array}{r} 4(x - 5y = 20) \\ 20x - 5y = 50 \\ \underline{x - 5y = 20} \\ 19x = 30 \\ \underline{19} \\ x = 1.579 \end{array}$$

2. YES
 $(-3, -2);$
 $3(3x - 2y = -5)$

$$\begin{array}{r} 9x - 6y = -15 \\ 2(4x + 3y = -18) \\ \underline{8x + 6y = -36} \\ 17x = -51 \\ \underline{17} \\ x = -3 \end{array}$$

$$\begin{array}{r} 4x - y = 10 \\ 4x - 20y = 80 \\ \underline{19y = -70} \\ 19 \\ y = -3.684 \end{array}$$

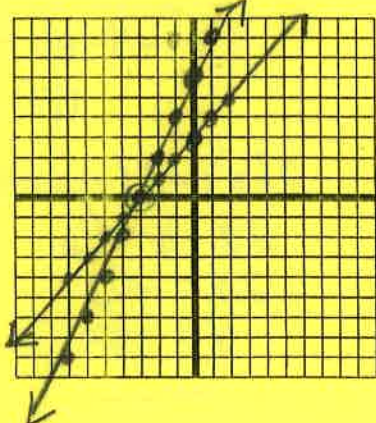
$$\begin{array}{r} 12x - 8y = -20 \\ 12x + 9y = 54 \\ \underline{-17y = 34} \\ -17 \\ y = -2 \end{array}$$

3. YES
 $(6, 4);$
 $2x + y = 16$

$$\begin{array}{r} 6y = 24 \\ \underline{y = 4} \\ 3\left(\frac{2}{3}x + \frac{1}{3}y = \frac{16}{3}\right) \\ 2x + y = 16 \\ 5\left(-\frac{2}{5}x + y = \frac{8}{5}\right) \\ -2x + 5y = 8 \\ -2x + 5(-2x + 16) = 8 \\ -2x - 10x + 80 = 8 \\ -12x = -72 \\ \underline{-12} \\ x = 6 \end{array}$$

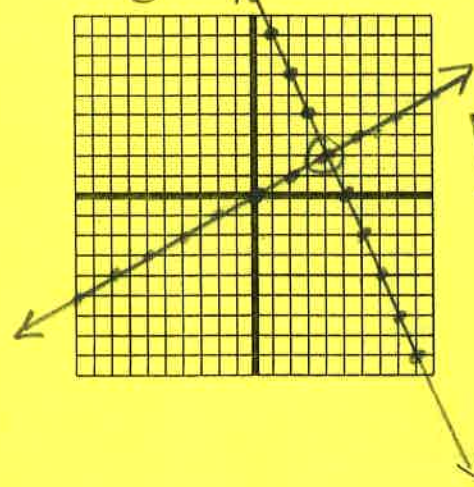
Solve the linear system by graphing. You may need to rewrite equations into slope-intercept ($y=mx+b$) form first! Determine your solution from the graph. Check your solution algebraically. Write next to your graph if the system has one solution, no solution, or infinitely many solutions.

4. $y = 2x + 6$
 $x = y - 3$ $y = x + 3$



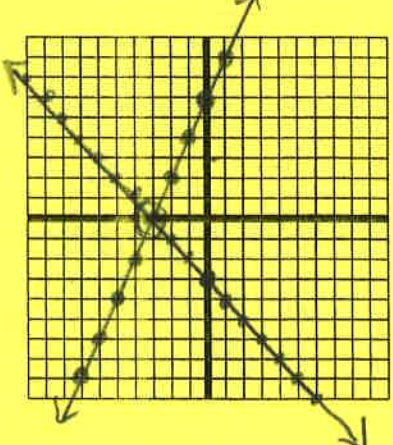
(-3, 0)

5. $y = \frac{1}{2}x$
 $2x + y = 10$ $y = -2x + 10$



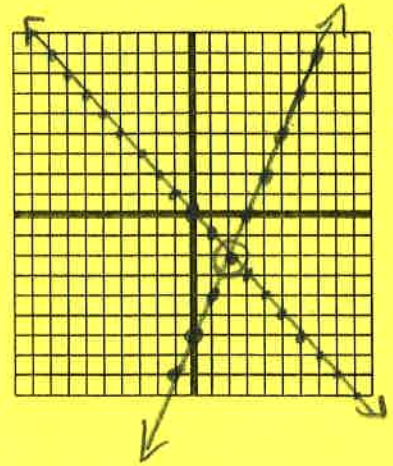
(4, 2)

6. $y = 2x + 6$
 $y = -x - 3$

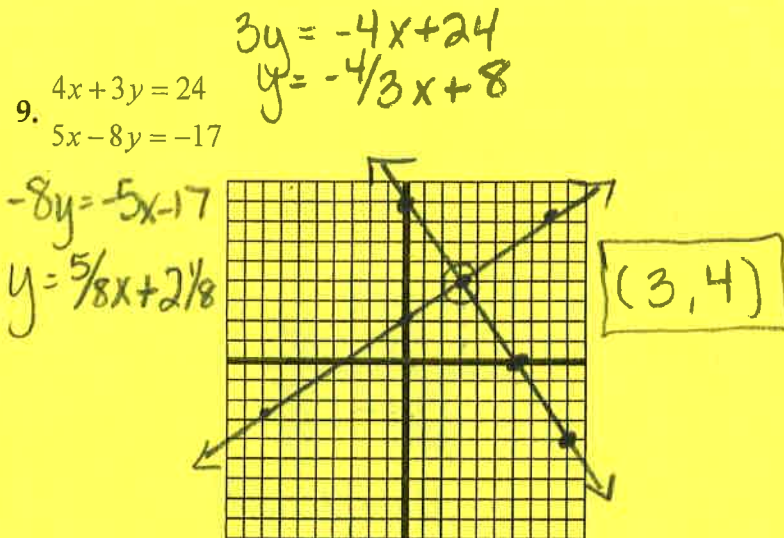
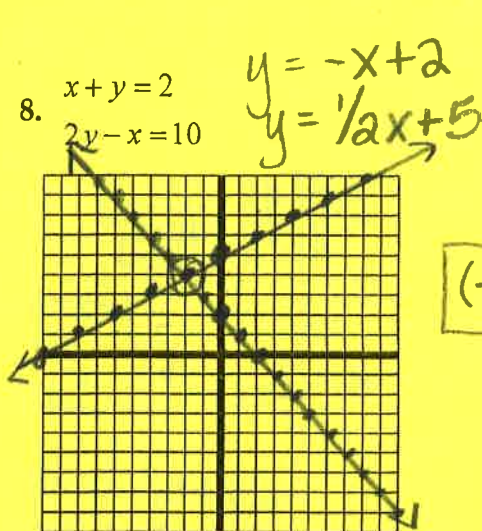


(-3, 0)

7. $y = -x$
 $y = 2x - 6$



(2, -2)



Solve the linear system by using substitution, elimination, or equal values. Write your solution on the blanks provided.

10.

$$\begin{array}{r} x+2y=10 \\ + \quad -x+y=2 \\ \hline 3y=12 \\ y=4 \\ -x+4=2 \\ -x=-2 \\ x=2 \end{array}$$

Solution: $(2, 4)$

11.

$$\begin{array}{r} 3y-8x=9 \\ y-x=2 \quad y=x+2 \\ 3(x+2)-8x=9 \\ 3x+6-8x=9 \\ -5x=3 \quad y=-\frac{3}{5}+2 \\ x=-\frac{3}{5} \quad y=1\frac{2}{5} \end{array}$$

Solution: $(-\frac{3}{5}, 1\frac{2}{5})$

12.

$$\begin{array}{r} 5(2x-6y=-16) \quad 10x-30y=-80 \\ 2(5x+7y=-18) \quad 10x+14y=-36 \\ \hline -44y=-44 \\ y=1 \\ 2(x)-6(1)=-16 \\ 2x-6=-16 \\ 2x=-10 \\ x=-5 \end{array}$$

Solution: $(-5, 1)$

13.

$$\begin{array}{r} 3x-2y=12 \\ 2(\frac{3}{2}x-y=3) \quad 3x-2y=6 \\ \hline 0 \neq 6 \end{array}$$

(No Solution)

Parallel Lines

14.

$$\begin{array}{r} 12(\frac{3}{4}x+\frac{1}{3}y=1) \quad 9x+4y=12 \\ x-y=10 \quad x=y+10 \\ 9(y+10)+4y=12 \\ 9y+90+4y=12 \\ 13y+90=12 \\ 13y=-78 \\ y=-6 \\ x=-6+10 \\ x=4 \end{array}$$

$(4, -6)$

15.

$$\begin{array}{r} 5(3x-2y=-3) \quad 15x-10y=-15 \\ 25x+10y=215 \quad 25x+10y=215 \\ \hline 40x=200 \\ x=5 \\ 25(5)+10y=215 \\ 125+10y=215 \\ 10y=90 \\ y=9 \end{array}$$

$(5, 9)$

Solution: _____

Solution: _____

Solution: _____

16.

$$\begin{aligned} 8\left(\frac{m}{2} + \frac{g}{8} = 3\right) & \quad 4m + g = 24 \\ 16\left(\frac{m}{4} - \frac{g}{16} = 1\right) & \quad + \quad 4m - g = 16 \end{aligned}$$

$$\begin{aligned} 8m &= 40 \\ m &= 5 \end{aligned}$$

$$\begin{aligned} 4(5) + g &= 24 \\ 20 + g &= 24 \\ g &= 4 \end{aligned}$$

Solution: $(4, 5)$

17.

$$\begin{aligned} x &= 4 - 8y \\ 3x + 24y &= 12 \end{aligned}$$

$$\begin{aligned} 3(4 - 8y) + 24y &= 12 \\ 12 - 24y + 24y &= 12 \\ 12 &= 12 \end{aligned}$$

All Real Numbers

Solution: _____

18.

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

$$\begin{aligned} 2y &= 6 \\ y &= 3 \end{aligned}$$

$$\begin{aligned} 2x - 3 &= 3 \\ 2x &= 6 \\ x &= 3 \end{aligned}$$

Solution: $(3, 3)$

For each word problem, write a system of linear equations and solve it to answer the questions. Make sure you include *Let Statements* to define the variables used in your systems.

19. The length of the rectangle is 1 meter less than twice its width. The perimeter of the rectangle is 40 meters. What are the dimensions of the rectangle?

$$\begin{aligned} L &= 2W - 1 \\ 2L + 2W &= 40 \end{aligned}$$

Let L = length
Let W = width

$$\begin{aligned} 2(2w - 1) + 2w &= 40 \\ 4w - 2 + 2w &= 40 \end{aligned}$$

$$\begin{aligned} 6w - 2 &= 40 \\ 6w &= 42 \\ \boxed{W = 7} \\ \boxed{L = 13} \end{aligned}$$

20. Seven times a number plus three times another number equals negative one. The sum of the two numbers is negative three. What are the numbers?

$$7x + 3y = -1$$

$$x + y = -3 \rightarrow x = -y - 3$$

$$\begin{aligned} x - 5 &= -3 \\ \boxed{x = 2} \end{aligned}$$

Let x = a number
Let y = another number

$$\begin{aligned} 7(-y - 3) + 3y &= -1 \\ -7y - 21 + 3y &= -1 \\ -4y &= 20 \\ \boxed{y = -5} \end{aligned}$$

21. A buffet restaurant has one price for adults and another price for children. The Taylor family has two adults and three children, and their bill was \$40.50. The Wong family has three adults and one child. Their bill was \$38. Write and solve a system of equation to find the price of one adult meal and one child meal.

Let A = adult Let C = children

$$2A + 3C = 40.5$$

$$3A + C = 38 \rightarrow C = -3A + 38$$

$$\begin{aligned} C &= -3(10.5) + 38 \\ C &= -31.5 + 38 \\ \boxed{C = 6.5} \end{aligned}$$

$$2A + 3(-3A + 38) = 40.5$$

$$2A - 9A + 114 = 40.5$$

$$\begin{aligned} -7A &= -73.5 \\ \boxed{A = 10.5} \end{aligned}$$

22. Tickets for a school play cost \$4 for adults and \$2 for students. At the end of the play, the school sold a total of 105 tickets and collected \$360. Write a linear system to find the number of adult tickets sold and the number of student tickets sold.

Let A = adults
Let S = students

$$\begin{array}{r} A + S = 105 \\ 4A + 2S = 360 \end{array} \quad \begin{array}{r} 2A + 2S = 210 \\ \underline{4A + 2S = 360} \\ -2A = -150 \\ \boxed{A = 75} \end{array}$$

$$\begin{array}{r} 75 + S = 105 \\ \boxed{S = 30} \end{array}$$

23. Melissa and Abbie collect marathon medals. Abbie has five less than three times the number of medals Melissa has. Together they have forty-three medals. Write and solve a system of linear equations to find the number of medals Melissa and Abbie each have.

m = melissa
 A = Abbie

$$\begin{array}{r} m + A = 43 \\ A = 3m - 5 \end{array}$$

$$\begin{array}{r} m + 3m - 5 = 43 \\ \underline{4m = 48} \\ \boxed{m = 12} \end{array}$$

$$\begin{array}{r} A = 3(12) - 5 \\ A = 36 - 5 \\ \boxed{A = 31} \end{array}$$

24. At a restaurant, the cost of 2 burritos and 1 tortilla salad is \$20.57. The cost for 3 burritos and 3 tortilla salads is \$36.24. Which pair of equations can be used to determine b , the cost of a burrito, and t , the cost of a tortilla salad?

A. ~~$b + t = 20.57$~~
 ~~$3b + 3t = 36.24$~~

B. $2b + t = 20.57$
 $3b + 3t = 36.24$

C. ~~$2b + t = 20.57$~~
 ~~$b + t = 36.24$~~

D. ~~$b + 2t = 20.57$~~
 ~~$b + t = 36.24$~~

Solve

$$\begin{array}{r} 6b + 3t = 61.71 \\ - \quad 3b + 3t = 36.24 \\ \hline 3b = 25.47 \\ b = 8.49 \end{array}$$

$$\begin{array}{r} 2(8.49) + t = 20.57 \\ 16.98 + t = 20.57 \\ t = 3.59 \end{array}$$