

Assignment* - Infinite Algebra 1

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Algebra 1 Name _____

Systems of Equations Review Date _____

3 Types of Special Systems Solutions

1) Infinite Solutions

- all points in common
- same equation
- same line

2) No Solution

- no points in common
- same slopes
- parallel lines

3) One Solution

- cross at exactly one point
- have an (x,y) solution

SOLVING SYSTEMS BY GRAPHING

SOLVING SYSTEMS BY GRAPHING

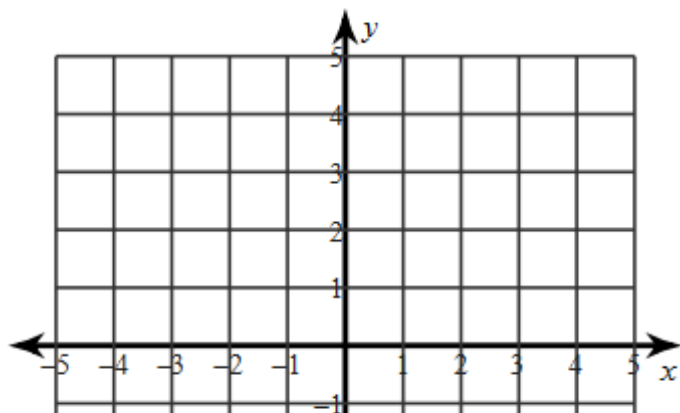
Notes:

- parallel lines - no solution (NS)
- Same line - infinite solutions (IS)

- graph both lines and see where they cross
- write your final answer as an ordered pair, NS, or IS

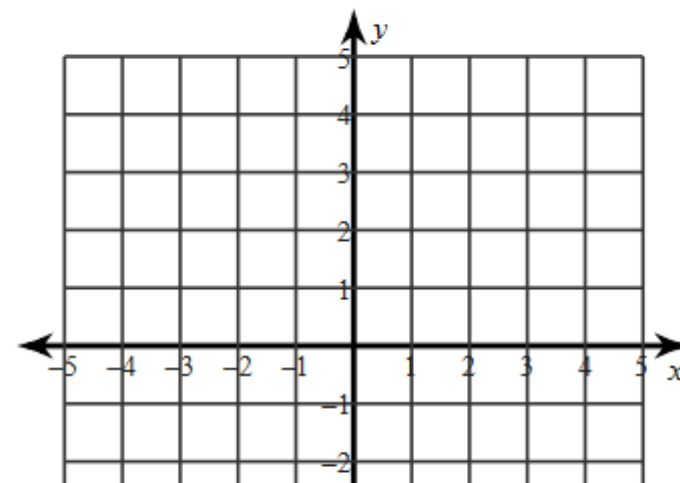
4) $y = x - 4$

$$y = -\frac{5}{3}x + 4$$



5) $y = x + 3$

$$y = 7x - 3$$



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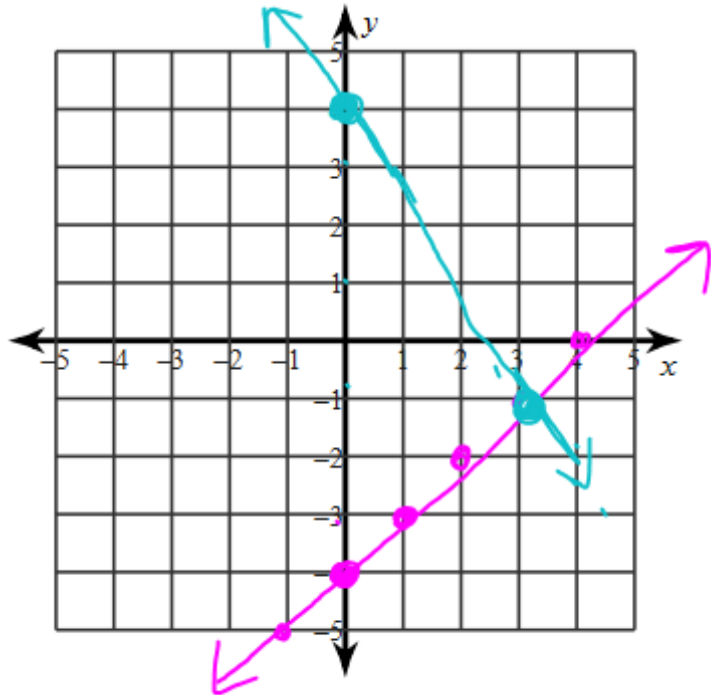
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4) $y = x - 4$

$y = -\frac{5}{3}x + 4$

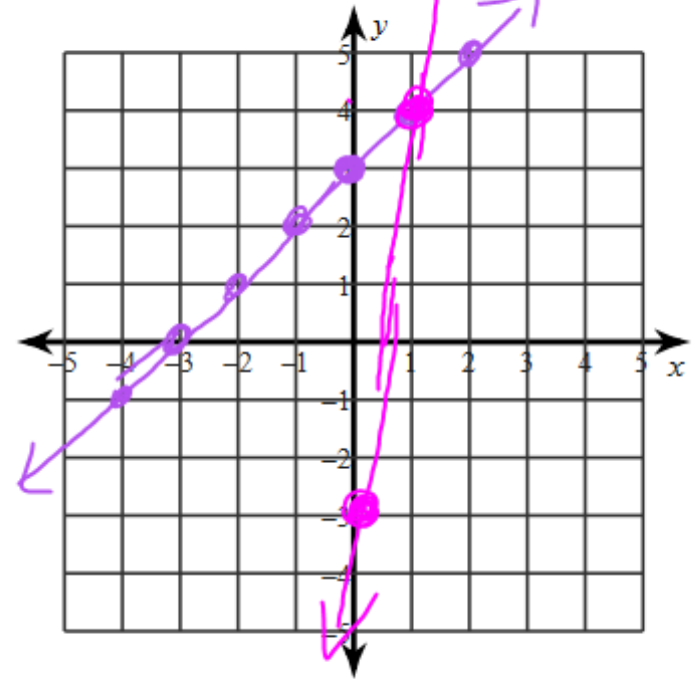
(3, -1)



5) $y = x + 3$

$y = 7x - 3$

(1, 4)



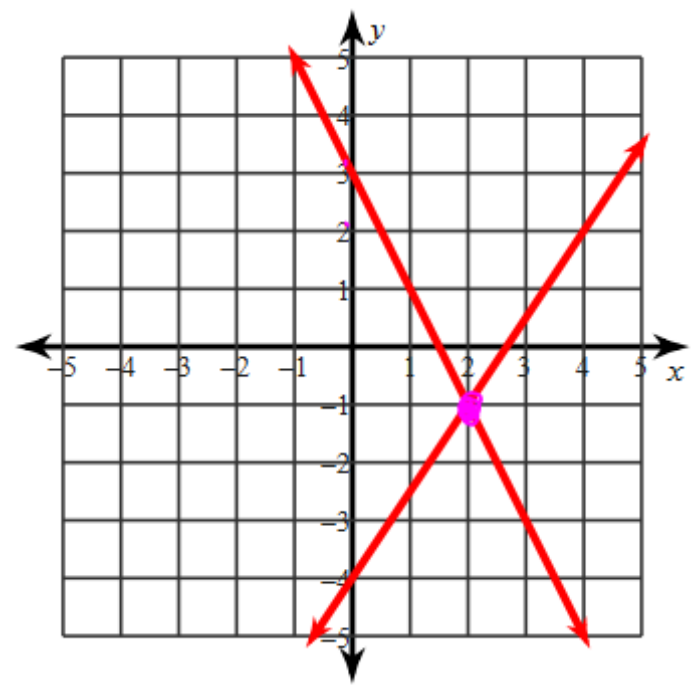
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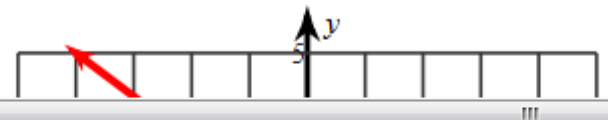
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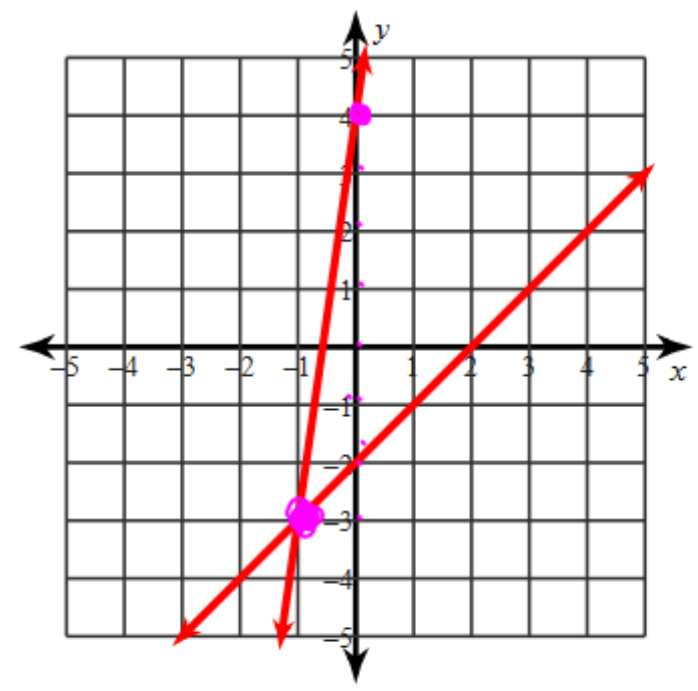
6) $y = \frac{3}{2}x - 4$
 $y = -2x + 3$



$(2, -1)$
 8) $x - 4y = 8$
 $3x + 4y = 8$



7) $y = 7x + 4$
 $y = x - 2$



$(-1, -3)$
 9) $4x - y = -3$
 $2x + y = -3$



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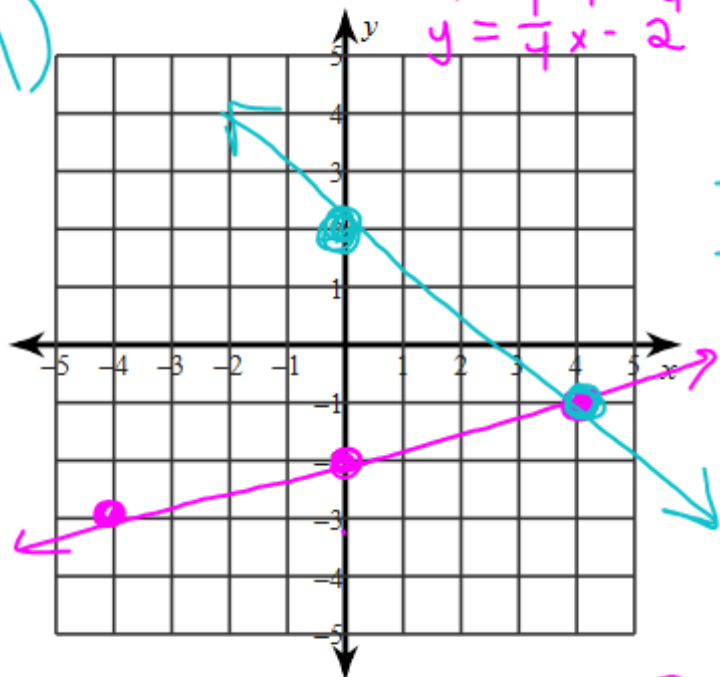
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8) $x - 4y = 8$
 $3x + 4y = 8$

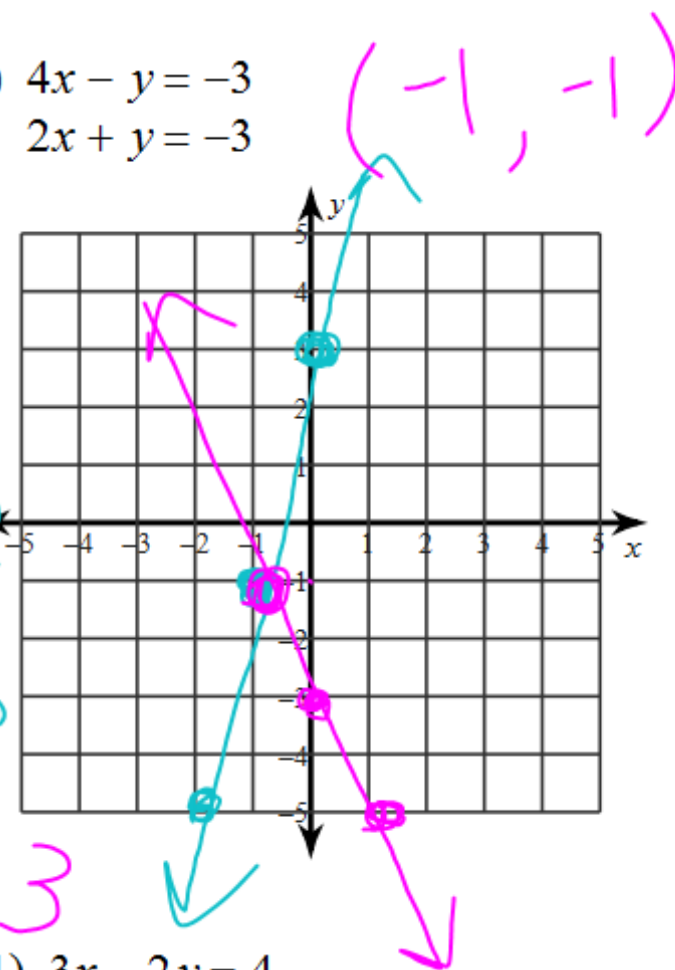
$$\begin{array}{r} x - 4y = 8 \\ -x = -x \\ \hline -4y = -1x + 8 \\ -4y = -\frac{1}{4}x + \frac{8}{-4} \\ y = \frac{1}{4}x - 2 \end{array}$$

(4, -1)

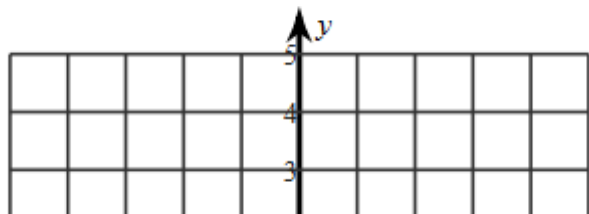


9) $4x - y = -3$
 $2x + y = -3$

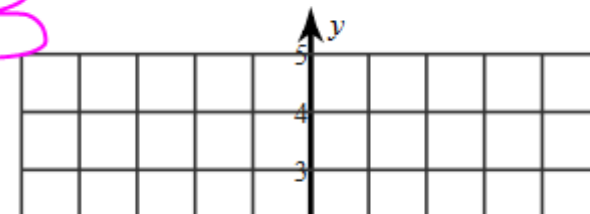
$$\begin{array}{r} 4x - y = -3 \\ -4x = -4x \\ \hline -y = -4x - 3 \\ -y = -4x - 3 \\ \frac{-y}{-1} = \frac{-4x}{-1} - \frac{3}{-1} \\ y = 4x + 3 \end{array}$$



10) $2x - y = -4$
 $x - 2y = 4$



11) $3x - 2y = 4$
 $x - 4y = -12$



$$\begin{array}{r} 2x + y = -3 \\ y = -2x - 3 \end{array}$$

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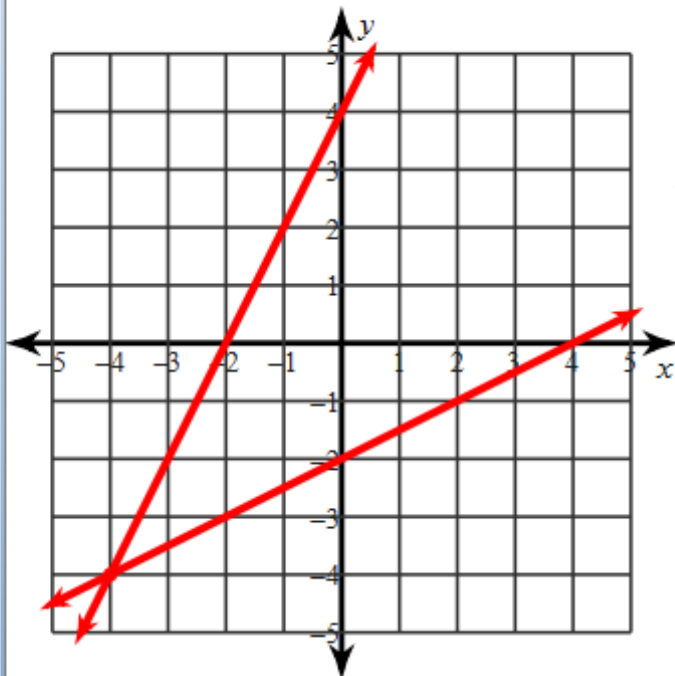
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10) $2x - y = -4$
 $x - 2y = 4$

$2x - y = -4$
 $-y = -2x - 4$
 $y = 2x + 4$

$x - 2y = 4$
 $-\frac{2}{2}y = \frac{-x + 4}{-2}$
 $y = \frac{1}{2}x - 2$

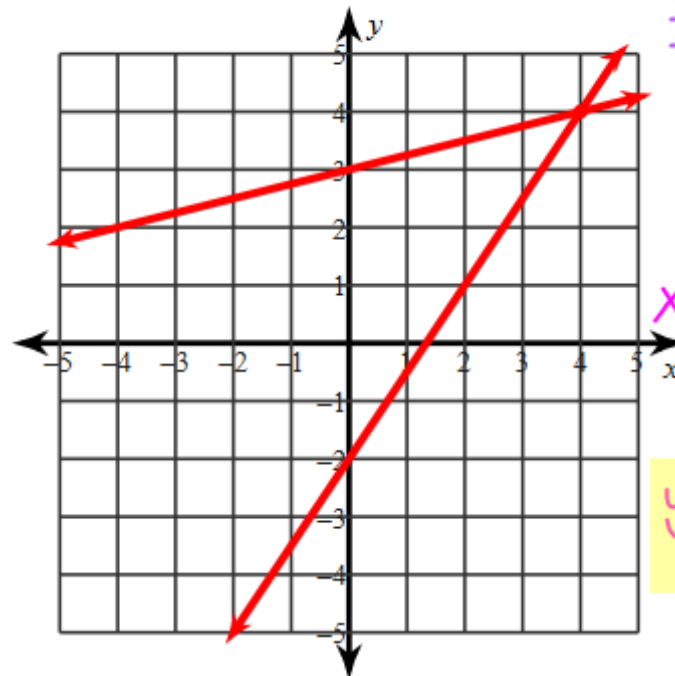


$(-4, -4)$

11) $3x - 2y = 4$
 $x - 4y = -12$

$3x - 2y = 4$
 $-\frac{2}{2}y = \frac{-3x + 4}{-2}$
 $y = \frac{3}{2}x - 2$

$x - 4y = -12$
 $-\frac{4}{4}y = \frac{-x - 12}{-4}$
 $y = \frac{1}{4}x + 3$



$(4, 4)$

Solve each system by substitution.

Notes: • get either x or y alone then substitute it into the other equation

- IS - all numbers and variables will cancel out
- NS - all variables will cancel out and 2 different numbers are left

$$12) \begin{cases} y = -8x + 24 \\ y = 6x - 4 \end{cases} \quad (2, 8)$$

$$\begin{array}{r} -8x + 24 = 6x - 4 \\ -6x \quad -24 \quad -6x \quad -24 \\ \hline \end{array}$$

$$-14x = -28$$

$$x = 2$$

$$y = 6(2) - 4$$

$$y = 8$$

$$14) y = -8x + 3$$

$$13) \begin{cases} y = -2x + 5 \\ y = -5x + 11 \end{cases} \quad (2, 1)$$

$$\begin{array}{r} -2x + 5 = -5x + 11 \\ +5x \quad +5 \quad +5x \quad -5 \\ \hline \end{array}$$

$$3x = 6$$

$$x = 2$$

$$y = -2(2) + 5$$

$$y = 1$$

$$15) y = -5x + 18$$

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$$14) \begin{cases} y = -8x + 3 \\ y = -6x + 1 \end{cases} \quad (1, -5)$$

$$\begin{array}{r} -8x + 3 = -6x + 1 \\ +6x \quad -3 \quad +6x \quad -3 \\ \hline -2x = -2 \\ x = 1 \end{array}$$

$$\begin{aligned} y &= -8(1) + 3 \\ y &= -5 \end{aligned}$$

$$16) \begin{cases} -x - 7y = -20 \\ y = -4x - 1 \end{cases} \quad (-1, 3)$$

$$\begin{array}{r} -x - 7(-4x - 1) = -20 \\ -x + 28x + 7 = -20 \\ \hline 27x + 7 = -20 \\ -7 \quad -7 \\ \hline 27x = -27 \\ x = -1 \end{array}$$

$$y = -4(-1) - 1 \quad (y = 3)$$

$$15) \begin{cases} y = -5x + 18 \\ y = x - 12 \end{cases} \quad (5, -7)$$

$$\begin{array}{r} -5x + 18 = x - 12 \\ -x \quad -18 \quad -x \quad -18 \\ \hline -6x = -30 \\ x = 5 \end{array}$$

$$\begin{aligned} y &= -5(5) + 18 \\ y &= -7 \end{aligned}$$

$$17) \begin{cases} y = -3x - 17 \\ -x - 4y = -20 \end{cases} \quad (-8, 7)$$

$$\begin{array}{r} -x - 4(-3x - 17) = -20 \\ -x + 12x + 68 = -20 \\ \hline 11x + 68 = -20 \\ -68 \quad -68 \\ \hline 11x = -88 \\ x = -8 \end{array}$$

$$\begin{aligned} y &= -3(-8) - 17 \\ y &= 7 \end{aligned}$$

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18) $y = 6x - 8$

$18x - 3y = 24$

$18x - 3(6x - 8) = 24$

$$\begin{array}{r} \boxed{18x - 18x} + 24 = 24 \\ \quad \quad \quad -24 \quad -24 \end{array}$$

Everything cancels!

IS

19) $2x - 4y = -18$

$y = 4x - 6$

$2x - 4(4x - 6) = -18$

$$\begin{array}{r} \boxed{2x - 16x} + 24 = -18 \\ \quad \quad \quad -24 \quad -24 \end{array}$$

$-14x = -42$

$x = 3$

-3-

$y = 4(3) - 6$

$y = 6$

20) $4x - y = -20$

$x + 6y = 20$

21) $x - 6y = 7$

$-2x - 6y = 4$

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$$20) \begin{cases} 4x - y = -20 \\ x + 6y = 20 \end{cases} \quad x = -6y + 20 \in (-4, 4)$$

$$4(-6y + 20) - y = -20$$

$$\begin{array}{r} -24y + 80 - y = -20 \\ -25y + 80 = -20 \\ -25y = -100 \\ y = 4 \end{array}$$

$$y = 4$$

$$y = 4$$

$$x = -6(4) + 20$$

$$x = -4$$

$$22) \begin{cases} 4x - y = 11 \\ -5x + y = -15 \end{cases}$$

$$21) \begin{cases} x - 6y = 7 \\ -2x - 6y = 4 \end{cases} \quad x = 6y + 7$$

$$-2(6y + 7) - 6y = 4$$

$$\begin{array}{r} -12y - 14 - 6y = 4 \\ -18y - 14 = 4 \\ -18y = 18 \\ y = -1 \end{array}$$

$$-18y = 18$$

$$y = -1$$

$$x = 6(-1) + 7$$

$$x = -1$$

$$23) \begin{cases} 6x - 3y = 24 \\ 3x + y = 7 \end{cases}$$

(1, -1)

Solve each system by elimination.

Notes:

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Zoom: 150% Desired length:

22) $4x - y = 11$

$-5x + y = -15 \quad y = 5x - 15$

$4x - 1(5x - 15) = 11$

$$\begin{array}{r} 4x - 5x + 15 = 11 \\ -15 \quad -15 \\ \hline -x = -4 \end{array}$$

$-x = -4$

$x = 4$

$y = 5(4) - 15$

$y = 5$

 $(4, 5)$ **Solve each system by elimination.****Notes:**

23) $6x - 3y = 24$

$3x + y = 7 \quad y = -3x + 7$

$6x - 3(-3x + 7) = 24$

$$\begin{array}{r} 6x + 9x - 21 = 24 \\ +21 \quad +21 \\ \hline 15x = 45 \end{array}$$

$15x = 45$

$x = 3$

 $(3, -2)$

$y = -3(3) + 7$

$y = -2$

24) $8x - 5y = 17$

25) $-2x + 7y = 1$

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Zoom: 150% Desired length:

Solve each system by elimination.

- Notes:**
- get rid of x or y
 - have to get opposite #'s
(ex. 3 & -3)
 - can get IS or NS
as an answer

$$\begin{array}{r}
 24) \quad 8x - 5y = 17 \\
 \quad -8x + 5y = -21 \\
 \hline
 0 = -4 \\
 \text{NS}
 \end{array}$$

$$\begin{array}{r}
 25) \quad -2x + 7y = 1 \\
 \quad 2x + 9y = 15 \\
 \hline
 16y = 16 \\
 y = 1 \\
 2x + 9(1) = 15 \\
 2x + 9 = 15 \\
 2x = 6 \\
 x = 3
 \end{array}
 \quad (3, 1)$$

26) $x + 10y = 26$

27) $-4x + 8y = 28$

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26) $x + 10y = 26$

$$\underline{-6x - 10y = -6}$$

$$-5x = 20$$

$$x = -4$$

 $(-4, 3)$

$$-4 + 10y = 26$$

$$10y = 30$$

$$y = 3$$

27) $-4x + 8y = 28$

$$\underline{4x - y = 14}$$

$$7y = 42$$

$$y = 6 \quad (5, 6)$$

$$4x - 6 = 14$$

$$4x = 20$$

$$x = 5$$

-4-

28) $2x - 8y = -4$

$$x - 8y = 6$$

29) $8x + 3y = 20$

$$4x + 3y = 4$$

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28) $2x - 8y = -4$

$$\frac{-x + 8y = 6}{x = -10} \quad (-10, -2)$$

$$x = -10$$

$$2(-10) - 8y = -4$$

$$\begin{array}{r} -20 - 8y = -4 \\ +20 \quad +20 \end{array}$$

$$-8y = 16$$

$$y = -2$$

30) $-5x - 6y = 1$

$$-5x - y = 21$$

29) $8x + 3y = 20$

$$\frac{-4x + 3y = 4}{4x = 16} \quad (4, -4)$$

$$4x = 16$$

$$x = 4$$

$$8(4) + 3y = 20$$

$$\begin{array}{r} 32 + 3y = 20 \\ -32 \quad -32 \end{array}$$

$$3y = -12$$

$$y = -4$$

31) $-2x + 2y = -12$

$$-2x + 2y = -12$$

32) $3x - 5y = -21$

33) $8x - 2y = 18$

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$$\begin{array}{r}
 30) \quad -5x - 6y = 1 \\
 \quad +5x + y = 21 \\
 \hline
 \quad \quad -5y = -20 \quad (-5, 4) \\
 \quad \quad \quad y = 4 \\
 \quad -5x - 6(4) = 1 \\
 \quad -5x - 24 = 1 \\
 \quad \quad -5x = 25 \\
 \quad \quad \quad x = -5
 \end{array}$$

$$\begin{array}{r}
 32) \quad 3x - 5y = -21 \\
 \quad -6x - 6y = -6
 \end{array}$$

$$\begin{array}{r}
 34) \quad 12x + 3y = -27 \\
 \quad 6x + y = -13
 \end{array}$$

$$\begin{array}{r}
 31) \quad -2x + 2y = -12 \\
 \quad +2x + 2y = 12 \\
 \hline
 \end{array}$$

Everything cancels!

IS

$$\begin{array}{r}
 33) \quad 8x - 2y = 18 \\
 \quad -4x - y = -7
 \end{array}$$

$$\begin{array}{r}
 35) \quad 12x + 3y = 24 \\
 \quad 3x - y = 13
 \end{array}$$

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32) ~~$3x - 5y = -21$~~

$-6x - 6y = -6$

$6x - 10y = -42$

$-16y = -48$

$y = 3$

$-6x - 6(3) = -6$

$-6x - 18 = -6$

$-6x = 12 \quad x = -2$

34) $12x + 3y = -27$

$6x + y = -13$

36) $-90x + 10y = -23$

$54x - 6y = 12$

33) ~~$8x - 2y = 18$~~

~~$2(-4x - y = -7)$~~

~~$-8x - 2y = -14$~~

$-4y = 4$

$y = -1$

$(2, -1)$

$8x - 2(-1) = 18$

$8x + 2 = 18$

$8x = 16 \quad x = 2$

35) $12x + 3y = 24$

$3x - y = 13$

37) $5x + 5y = -25$

$1x + 1y = -5$

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34) $12x + 3y = -27$

~~$6x + y = -13$~~

~~$12x - 2y = 26$~~

$y = -1$

$12x + 3(-1) = -27$

$12x - 3 = -27$

$12x = -24$

$x = -2$

36) $-90x + 10y = -23$

$54x - 6y = 12$

35) $12x + 3y = 24$

~~$3x - y = 13$~~

~~$12x + 4y = -52$~~

$7y = -28$

$y = -4$

$3x - (-4) = 13$

$3x + 4 = 13$

$3x = 9$

$x = 3$

37) $5x + 5y = -25$

$-4x + 8y = -28$

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36) $\begin{cases} -90x + 10y = -23 \\ 5(54x - 6y = 12) \end{cases}$

NS

37) $\begin{cases} 5x + 5y = -25 \\ 5(-4x + 8y = -28) \end{cases}$

$$\begin{array}{r} -270x + 30y = -69 \\ 270x - 30y = 60 \\ \hline 0 = -9 \end{array}$$

$$\begin{array}{r} 27x + 20y = -100 \\ -20x + 40y = -140 \\ \hline 60y = -240 \\ y = -4 \end{array}$$

$$\begin{array}{r} 5x + 5(-4) = -25 \\ 5x - 20 = -25 \\ 5x = -5 \\ x = -1 \end{array}$$

$(-1, -4)$

-5-

38) $\begin{cases} 2x - 2y = 18 \\ 3x + 3y = 9 \end{cases}$

39) $\begin{cases} -3x + 3y = 0 \\ 10x - 4y = -18 \end{cases}$

38) $\begin{cases} 2x - 2y = 18 \\ 3x + 3y = 9 \end{cases}$ $\begin{matrix} 6x - 6y = 54 \\ -6x - 6y = -18 \\ \hline -12y = 36 \\ y = -3 \end{matrix}$

$2x - 2(-3) = 18$ $-12y = 36$
 $2x + 6 = 18$ $y = -3$
 $2x = 12$
 $x = 6$ $(6, -3)$

39) $\begin{cases} -3x + 3y = 0 \\ 10x - 4y = -18 \end{cases}$ $\begin{matrix} -12x + 12y = 0 \\ 30x - 12y = -54 \\ \hline 18x = -54 \\ x = -3 \end{matrix}$

$-3(-3) + 3y = 0$ $18x = -54$
 $9 + 3y = 0$ $x = -3$
 $3y = -9$
 $y = -3$
 $(-3, -3)$

Word problems: decide what variables you want to use and what they stand for then write your equations

Ex. $\begin{cases} a = \text{apple} \\ b = \text{banana} \end{cases}$ $\begin{cases} 2a + 3b = 10 \\ 6a - 4b = 12 \end{cases}$

40) The senior classes at High School A and High School B planned separate trips to the indoor climbing gym. The senior class at High School A rented and filled 3 vans and 13 buses with 297 students. High School B rented and filled 3 vans and 6 buses with 297 students. Each van and each bus carried the same number of students. Find the number of students in each van.

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The senior classes at High School A and High School B planned separate trips to the indoor climbing gym. The senior class at High School A rented and filled 3 vans and 13 buses with 612 students. High School B rented and filled 3 vans and 6 buses with 297 students. Each van and each bus carried the same number of students. Find the number of students in each van and in each bus.

$$A \cdot 3v + 13b = 612$$

$$B \quad \underline{-3v + 6b = -297}$$

$$7b = 315$$

$$b = 45$$

$$3v + 13(45) = 612$$

$$3v + 585 = 612$$

$$3v = 27 \quad v = 9$$

$$\boxed{\begin{array}{l} b = 45 \\ v = 9 \end{array}}$$

The school that Arjun goes to is selling tickets to the annual talent show. On the first day of ticket sales the school sold 8 senior citizen tickets and 2 child tickets for a total of \$62. The school took in \$80 on the second day by selling 8 senior citizen tickets and 8 child tickets. Find the price of a senior citizen ticket and the price of a child ticket.

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The school that Arjun goes to is selling tickets to the annual talent show. On the first day of ticket sales the school sold 8 senior citizen tickets and 2 child tickets for a total of \$62. The school took in \$80 on the second day by selling 8 senior citizen tickets and 8 child tickets. Find the price of a senior citizen ticket and the price of a child ticket.

$$\begin{array}{r} 8s + 2c = 62 \\ -8s + 8c = -80 \\ \hline \end{array}$$

$$\begin{array}{l} c = \$3 \\ s = \$7 \end{array}$$

$$\begin{array}{l} 8s + 2(3) = 62 \\ 8s + 6 = 62 \\ 8s = 56 \\ s = 7 \end{array}$$

$$\begin{array}{l} -6c = -18 \\ c = 3 \end{array}$$

senior citizen ticket: \$7, child ticket: \$3

cherry pie: \$12, pumpkin pie: \$16

rose bush: \$4, bunch of ornamental grass: \$2

bag of windflower bulbs: \$4, package of crocus bulbs: \$15

ft² of grass sod: \$7, pot of ivy: \$9

42) daylily: \$10, pot of ivy: \$8

44) hosta: \$2, geranium: \$9