

June 2018

Hello! I am Danette Salinas and I teach Advanced Math 8. I'd like to tell you a little bit about myself and the purpose of this summer work packet. I was raised in Pismo Beach, California and I graduated Fresno Pacific University with a degree in Mathematics. I have been teaching math at Clark Intermediate for over 20 years. I am married and have three children. I look forward to this upcoming school year as I take you through the 9th grade math standards in preparation for Math 2 at Clovis High School.

I have identified some key concepts that students need to understand in order to be successful in Advanced Math 8. I expect all students entering Advanced Math 8 to have a strong foundation in working with integers (positive and negative numbers), fractions, and percent. I have also found that students that are successful in Advanced Math 8 have a firm understanding of slope-intercept linear equations, solving systems of equations, and solving multiple step equations. Attached you will find a summer work packet to help you gain a good grasp on these concepts. While there are examples of most concepts in the packet, you may also want to look at some of the websites listed below for additional tutorials.

I expect this work packet to be completed by Thursday of the first week of school. You will have a quiz on the information in this packet. The review at the end of the packet will give you a good idea of what to expect on the quiz. If you have questions or need further explanation on anything in this packet, feel free to email me (information below).

Helpful websites:

www.khanacademy.org

www.youtube.com

www.mathtv.com (Just click on a person, try multiple people's explanations if needed)

Algebra: Linear Equations in two variables (graph, slope, etc)

Algebra: Systems of Equations – graphing, addition method

Algebra: Linear Equations in one variable (solve for x)

Enjoy your summer,

Danette Salinas

Advanced Math 8 Teacher

Clark Intermediate School

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Rule:

When there are variables on both sides of the equation, move all of the variables to one side of equation and the numbers to the other side.

Then, solve the equation for the variable and check the solution.

Example:

$$\begin{aligned} 6x &= 24 + 2x \\ 6x - 2x &= 24 + 2x - 2x \\ 4x &= 24 \\ x &= 6 \end{aligned}$$

$$\begin{aligned} \text{Check: } 6 \cdot 6 &= 24 + 2 \cdot 6 \\ 36 &= 36 \end{aligned}$$

Example:

$$\begin{aligned} 2(6n) + 12 + 4n &= 60 \\ 12n + 12 + 4n &= 60 \\ 16n + 12 &= 60 \\ 16n &= 48 \\ n &= 3 \end{aligned}$$

$$\begin{aligned} \text{Check: } 2(6 \cdot 3) + 12 + 4 \cdot 3 &= 60 \\ 36 + 12 + 12 &= 60 \\ 60 &= 60 \end{aligned}$$

Solve. Check.

<i>a</i>	<i>b</i>	<i>c</i>
1. $a + (-25) = 75$	$4(m + 3) - 7m = 54$	$r + (-12) = 3$
2. $3p + 9 = -15p$	$-15y = 105$	$-3(6x) - 8 + 4x = 76$
3. $-2(x + 3) + 6(-x) = 34$	$\frac{x}{2} = 6$	$6(y - 4) + 2y + 8y = 72$
4. $5x + 6x = 1$	$4r - 3 = 3$	$5x + 7 = 2x + 8$
5. $3m + 1 = 6m - 5$	$4(x - 2) = 6x - 10$	$4(a + 2) = 2(a + 6)$
6. $-3\left(\frac{2}{3} - 6\right) = 32$	$5y - 2(y + 2) = 5$	$6y - 4 = 2(2y + 1)$

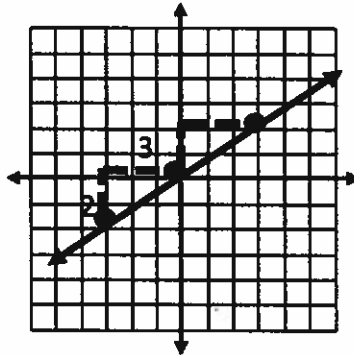
Slope

You can find slope from a line, equation, two points, or a table.

Examples:

Line: do $\frac{\text{rise}}{\text{run}}$

$$\frac{\text{rise}}{\text{run}} = \boxed{\frac{2}{3}}$$



Equation: look for coefficient of x

$$y = 3x - 2$$

$$\text{slope} = \boxed{3}$$

Two points: do $\frac{y_2 - y_1}{x_2 - x_1}$

$$(3, -5) \text{ and } (7, 2) \rightarrow \frac{2 - (-5)}{7 - 3} = \boxed{\frac{7}{4}}$$

Table: find $\frac{\Delta y}{\Delta x} = \frac{\text{change of } y}{\text{change of } x}$

	x	y	
-2	-2	0	+3
-2	-4	3	+3
-2	-6	6	+3
	-8	9	+3

$$\frac{\text{change of } y}{\text{change of } x} = \boxed{\frac{3}{-2}}$$

Find the slope of each:

1. $y = \frac{1}{2}x + 7$

2. $y = -4x - 2$

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

4. $(4, 3) \text{ and } (-5, 2)$

5. $(-8, -1) \text{ and } (12, 5)$

6. $(2, 1) \text{ and } (7, -4)$

7.

x	y
-6	2
-3	6
0	10
3	14

8.

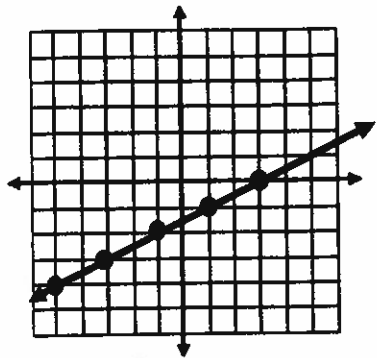
x	y
0	5
2	6
4	7
6	8

9.

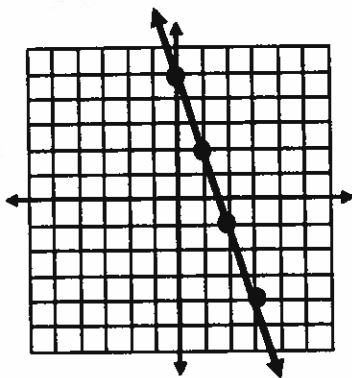
x	y
0	8
1	6
2	4
3	2

Find the slope:

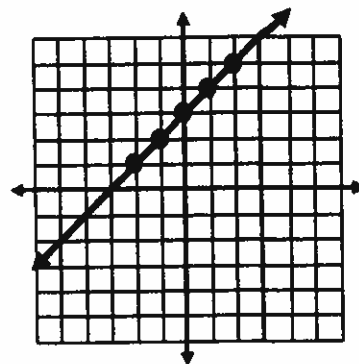
10.



11.



12.



Graphing Linear Equations Using Slope

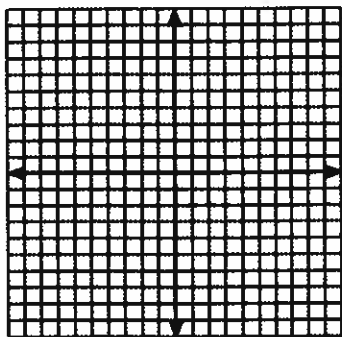
Graph the line that contains the given point and has the given slope.

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

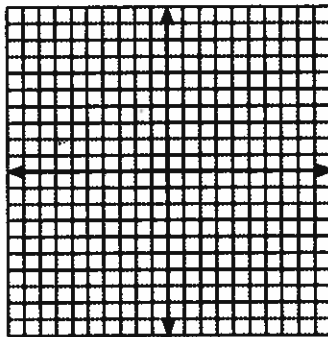
- Plot point.
- Locate other points by moving up 2 units and to the right 3 units.
- Connect the points with a line.

Graph the line

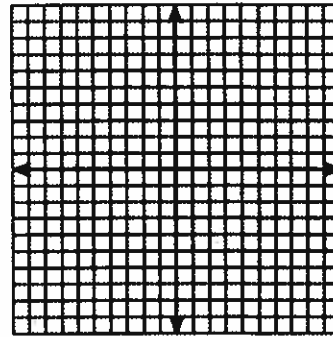
1. $(-5, -2), -\frac{1}{2}$



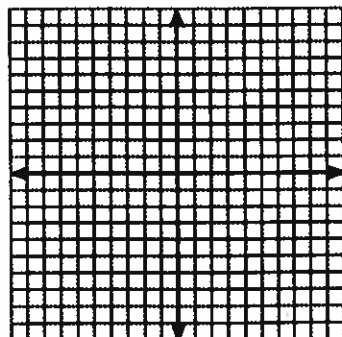
3. $(2, -3), \frac{3}{4}$



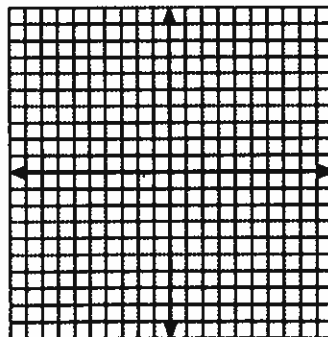
5. $(-1, -4), -\frac{1}{4}$



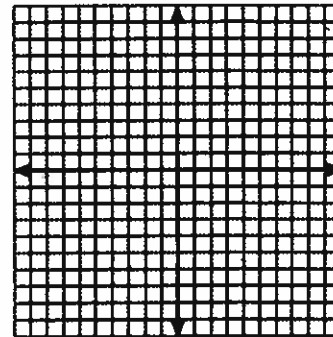
2. $(4, 2), 3$ (note: $3 = \frac{3}{1}$)



4. $(0, 2), -\frac{5}{2}$



6. $(3, -2), -2$





Ordered Pairs and Graphing

Graphing Linear Equations Using y-Intercept and Slope

Graph the lines given the equation using the y-intercept and slope.

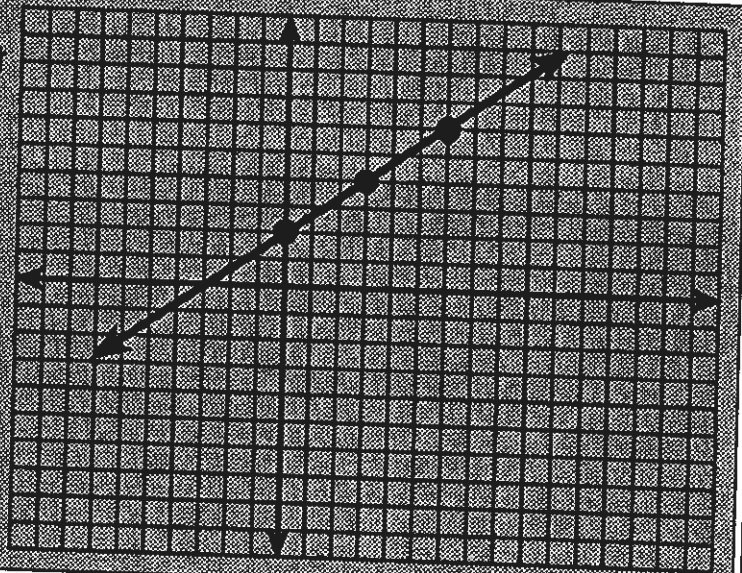
$$y = mx + b \quad m = \text{slope} \\ b = \text{y-intercept}$$

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

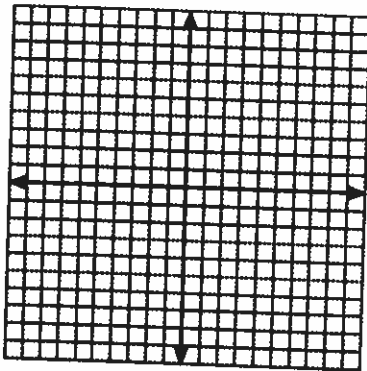
$$m = \text{slope} = \frac{2}{3}$$

$$b = \text{y-intercept} = (0, 2)$$

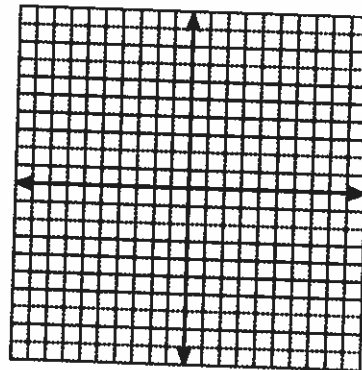
- Plot y-intercept.
- Locate other points using slope.
- Connect the points with a line.



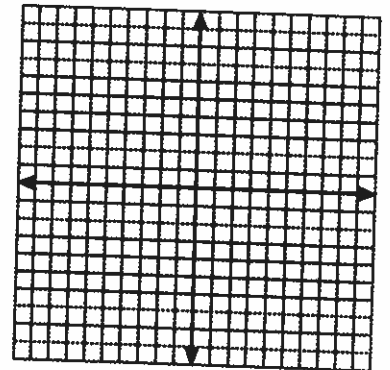
1. $y = \frac{1}{2}x - 1$



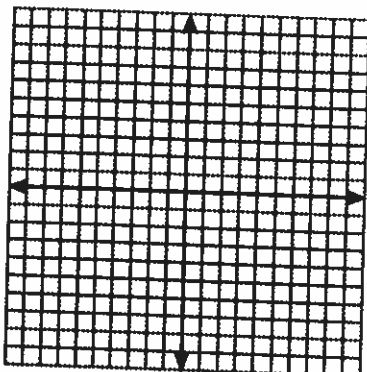
3. $y = -\frac{1}{3}x + 2$



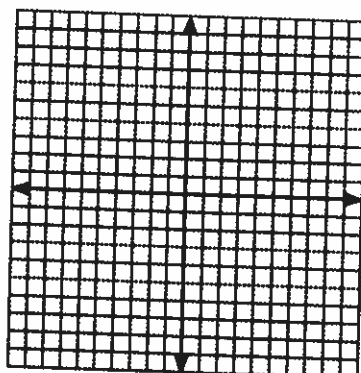
5. $y = -\frac{2}{3}x + 4$



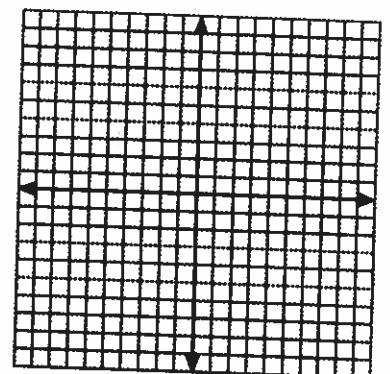
2. $y = 2x + 5$



4. $y = -3x - 1$



6. $y = x + 3$

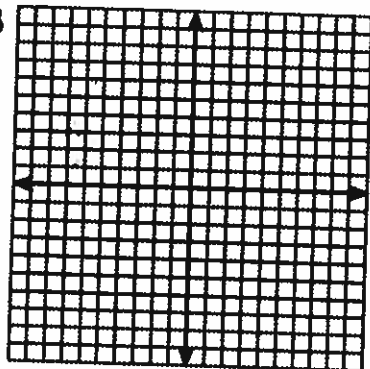


Graph the line

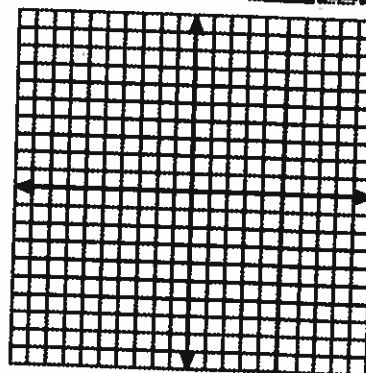
Ordered Pairs and Graphing



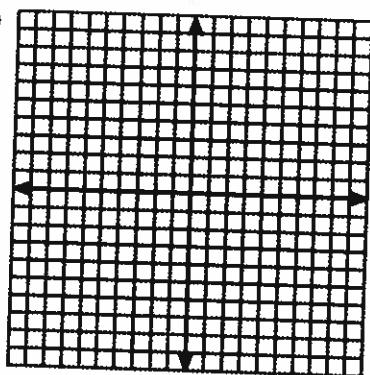
1. $y = \frac{1}{2}x - 3$



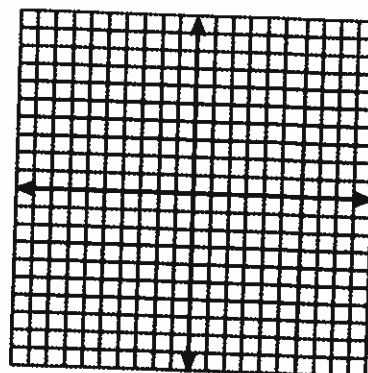
5. $3x + y = 7$



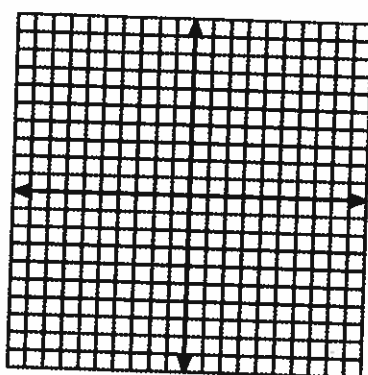
2. $-2x + y = 5$



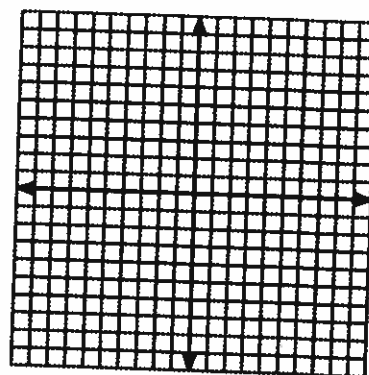
6. $3x - y = -2$



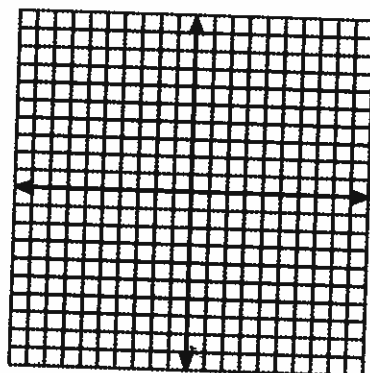
3. $4x + y = -7$



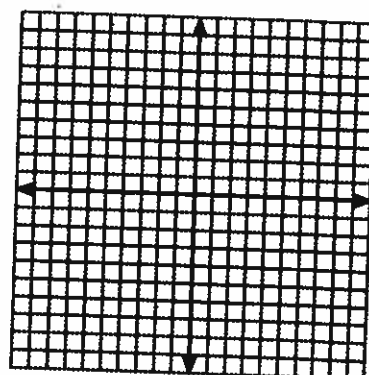
7. $y + 7 = 5x$



4. $y - 3 = 2x$



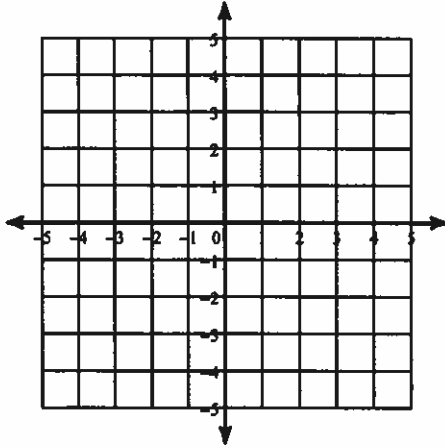
8. $y = \frac{1}{4}x - 2$



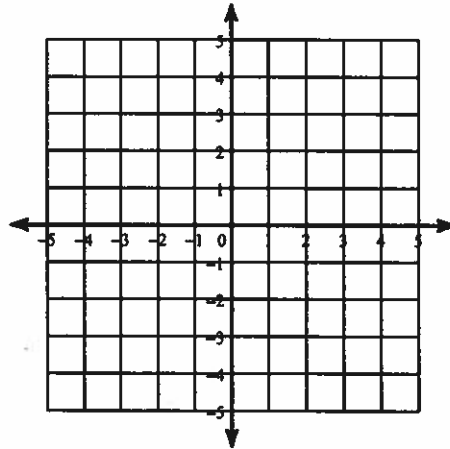
Solving Systems of Equations by Graphing

Solve each system by graphing (find the point of intersection of the two lines).

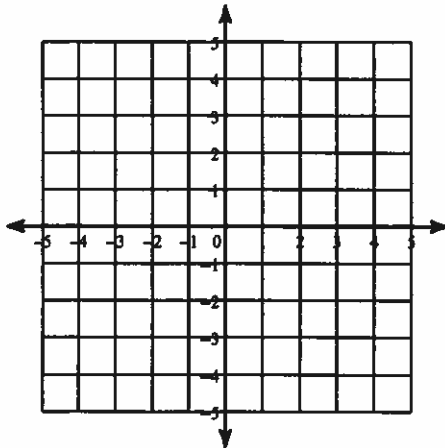
$$1) \begin{aligned} y &= 2x - 3 \\ y &= -3x + 2 \end{aligned}$$



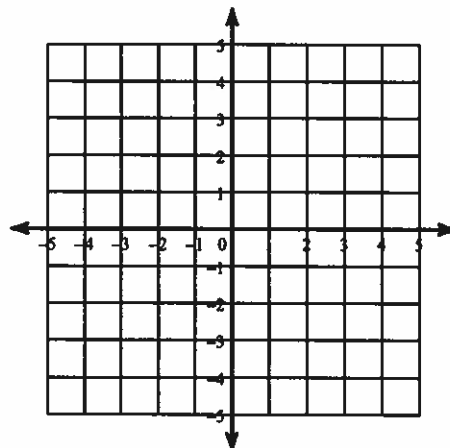
$$2) \begin{aligned} y &= -\frac{5}{3}x + 1 \\ y &= -\frac{1}{3}x - 3 \end{aligned}$$



$$3) \begin{aligned} y &= -x + 1 \\ x &= 3 \end{aligned}$$

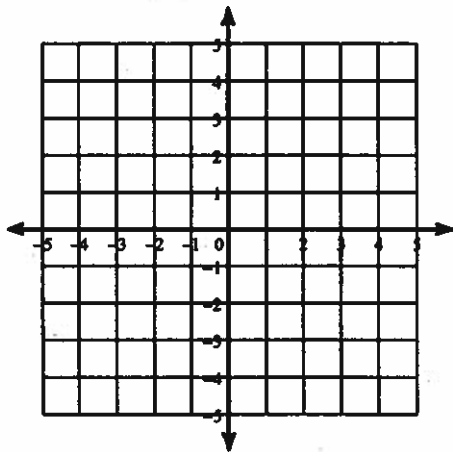


$$4) \begin{aligned} y &= 4x + 1 \\ y &= x - 2 \end{aligned}$$



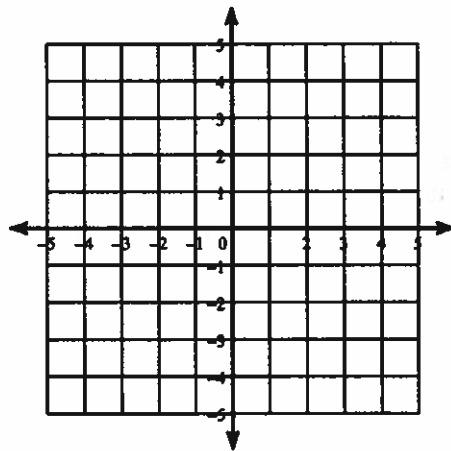
$$5) y = -\frac{1}{3}x + 2$$

$$y = -2x - 3$$



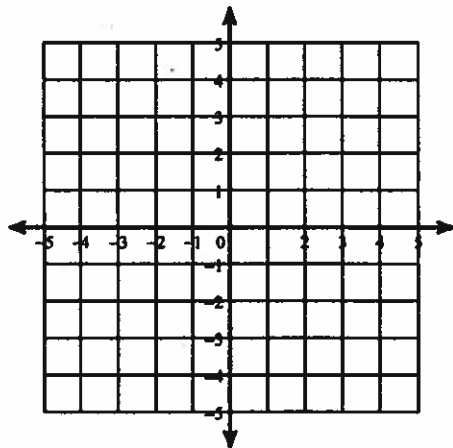
$$6) y = -\frac{1}{4}x + 3$$

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



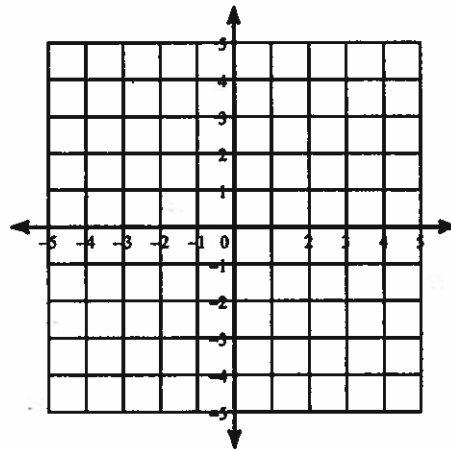
$$7) y = \frac{4}{3}x - 3$$

$$y = 1$$



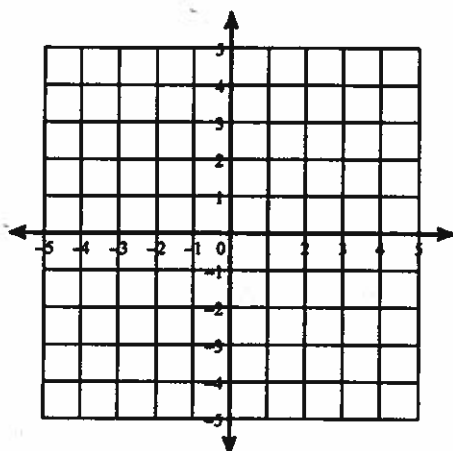
$$8) y = -2x - 4$$

$$y = 4x + 2$$



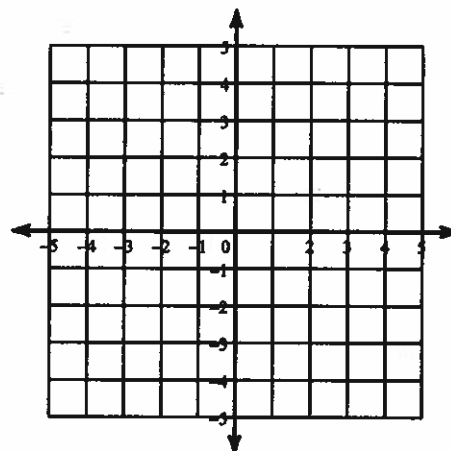
$$9) y = -\frac{3}{2}x + 4$$

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



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

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



Another method for solving systems of equations is the elimination method. You eliminate one variable when combining the equations and solve for the remaining variable. Once it is found, you use it to solve for the other variable through substitution.

Example:

$$\begin{array}{r} x + y = 10 \\ x - y = 2 \end{array} \longrightarrow \begin{array}{r} x + y = 10 \\ \cancel{x - y} = 2 \\ \hline 2x = 12 \\ \div 2 \quad \div 2 \\ \hline x = 6 \end{array}$$

Combine equations to eliminate
Continue to solve for remaining variable

Use that answer to solve for the remaining variable, y , through substitution. Use either of the original equations to do this.

$$\begin{array}{r} x + y = 10 \\ \longrightarrow \end{array} \begin{array}{r} (6) + y = 10 \\ \underline{-6} \quad \underline{-6} \\ y = 4 \end{array}$$

So the one solution for this system of equations is $(6, 4)$

Solve the system of equations using the elimination method.

1. $\begin{array}{r} x + y = 6 \\ x - y = 12 \end{array}$

2. $\begin{array}{r} 6x - 3y = 6 \\ 3x + 3y = 3 \end{array}$

3. $\begin{array}{r} 2x + y = 14 \\ 2x - y = 10 \end{array}$

4. $\begin{array}{r} x + y = 8 \\ -x + 2y = 7 \end{array}$

5. $\begin{array}{r} x + y = 6 \\ -x + 3y = -2 \end{array}$

6. $\begin{array}{r} 4x - y = 1 \\ 3x + y = 13 \end{array}$

7. $\begin{array}{r} 5x - 6y = -32 \\ 3x + 6y = 48 \end{array}$

8. $\begin{array}{r} 5x + 2y = 13 \\ -5x + y = 2 \end{array}$

9. $\begin{array}{r} 2x - 6y = -12 \\ -2x - 2y = -4 \end{array}$

10. $-x + y = 12$
 $x - y = 3$

11. $2x - y = 9$
 $4x + y = 3$

12. $3x + 4y = 4$
 $-10x - 4y = -32$

Some elimination problems require you to multiply a factor with one (or both) of the original equation(s) in order to solve. After multiplying, you will be able to eliminate one variable when combining the equations and solve for the remaining variable. Once it is found, you use it to solve for the other variable through substitution.

Example: $x + y = -7$ $-1(x + y = -7)$ Distribute $-x - y = 7$
 $3x + y = -9$ $3x + y = -9$ $3x + y = -9$

$-x - y = 7$ Combine equations to eliminate
 $3x + y = -9$
 $2x = -2$ Continue to solve for remaining variable using inverse operations
 $\frac{\div 2}{\div 2}$
 $x = -1$

Use that answer to solve for the remaining variable, y , through substitution. Use either of the original equations to do this.

$x + y = -7$ $(-1) + y = -7$
 $\frac{+ 1}{+ 1}$
 $y = -6$

So the one solution for this system of equations is $(-1, -6)$

Solve the system of equations using the elimination method.

13. $-x - y = 8$
 $2x - y = -1$

14. $x + y = -7$
 $3x + y = -9$

15. $x + 5y = 14$
 $4x - 2y = 12$

16. $-3x + 3y = 0$
 $x - y = 4$

17. $x + y = 4$
 $-2x + y = 1$

18. $4x + 3y = 18$
 $2x + 5y = -12$

19. $6x + y = -2$
 $3x + y = 1$

20. $4x + 2y = 2$
 $3x + y = 4$

21. $-x + y = -8$
 $-2x + y = -14$

22. $2x - 5y = 1$
 $x - 2y = 2$

23. $-2x + 9y = -1$
 $x - 5y = 1$

24. $6x + 3y = 24$
 $3x + y = 10$

Find the slope of the line through these points:

1. (6,3) and (8,7)

2. (-4,11) and (5, -6)

1. _____

2. _____

State the slope and y-intercept:

3. $y = -6x + 12$

4. $3x + y = 7$

5. $4x - 2y = 10$

3. Slope = _____
y-intercept = _____

4. Slope = _____
y-intercept = _____

5. Slope = _____
y-intercept = _____

Write the equation of a line in slope-intercept form ($y=mx + b$):

6. through (2,4) and has a slope of 5

6. _____

7. through (-3,1) and (6,4)

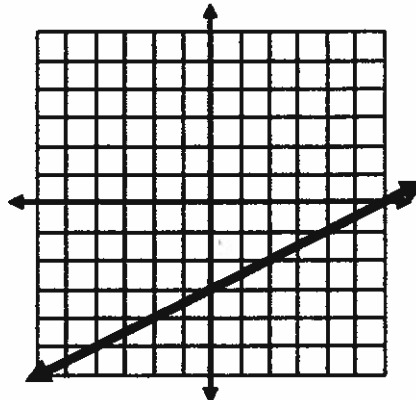
7. _____

8. A driver's training school charges \$40 per lesson and \$55 for insurance. Write an equation in slope-intercept form ($y=mx + b$) to represent this situation.

8. _____

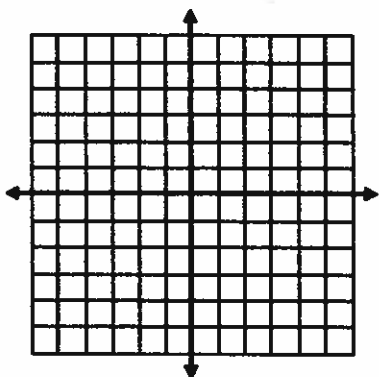
9. Write the equation of the line in slope-intercept form:

9. _____

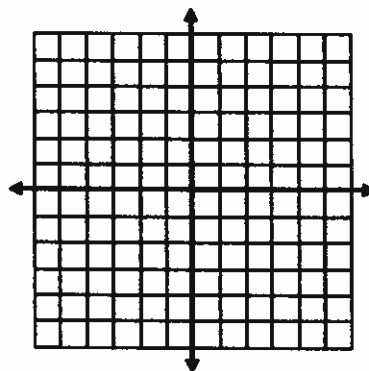


Graph the following:

10. $y = -2x + 5$



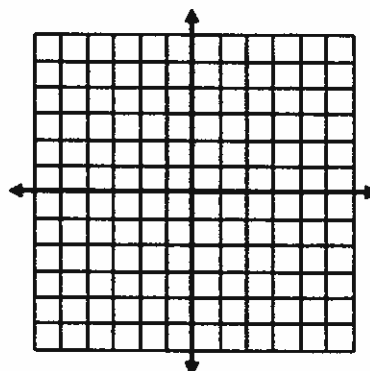
11. $-3x + 9y = -18$



Solve the following using graphing. (Hint: Find the point of intersection)

12. $5x - 2y = 12$
 $3x + 2y = 4$

12. _____



Solve the following using the elimination method. Hint: answers should look like ordered pairs (x, y)

13. $2x + 2y = 6$
 $6x + y = -7$

14. $3x + 2y = 18$
 $7x + 3y = 32$

13. _____

14. _____

Solve for x:

15. $5x + 4(3x - 8) = 4 + 13x$

16. $x - (5 - 3x) = 7x + 4$

15. _____

16. _____