Summer Review Packet for Students Entering Algebra 2

Solving Equations

When solving equations you need to isolate the variable using inverse operations.

Example:

$$5t+16=6-5t$$
$$+5t \qquad +5t$$
$$10t+16=6$$
$$-16 \quad -16$$
$$10t=-10$$
$$\frac{10t}{10}=\frac{-10}{10}$$
$$t=-1$$

Solve the following equations.

1) $\frac{1}{4}x=7$

2) $-3x+7=28$

3) $12y+6=6(2y+1)$

4) $5(1+2m)=\frac{1}{2}(8+20m)$

5) $6d+8=14+3d$

6) You receive a $75 gift card to your favorite store to buy new shirts. If shirts cost $13.99, how many can you buy?

Solving Absolute Value Equations.

Example:

$|x-3|=5$

$x-3=-5$ *or* $x-3=5$

$+3 \quad +3 \qquad +3 \quad +3$

$x=-2 \qquad x=8$

Solve the following equations.

7) $|x+5|=12$ 8) $|2n|-8=14$ 9) $|2x+1|=13$

Solving linear inequalities is the same as solving linear equations *EXCEPT* if you divide or multiply by a negative number you must change the direction of the inequality symbol.

Example:

$3-2x \le 5$

$-3 \qquad -3$

$-2x \le 2$

$\frac{-2x}{-2} \ge \frac{2}{-2}$

$x \ge -1$

Solve the following inequalities.

10) $x+7 \le -3$ 11) $x-2>4$ 12) $-5 \ge -25x$

13) $\frac{y}{-2}<3$ 14) $-1+2x>9-3x$ 15) $3x+1 \le 4x-5$

Compound inequalities.

Example:

$5 < x+2 < 14$

$-2 \quad -2 \quad -2$

$3 < x < 12$

$x+5 < -1 \text{ or } x-4 \geq 7$

$-5 \quad -5 \qquad +4 \quad +4$

$x < -6 \quad \text{or} \quad x \geq 11$

16) $2 \leq x+4 < 12$

17) $-4 < x-3 < 8$

18) $-6 \leq -2x+4 < 10$

19) $s+2 < -5 \text{ or } -4s \leq 8$

20) $2x+3 < 8 \text{ or } x+1 > 9$

Absolute Value inequalities. If it is a < or $\leq$ equation then write as a between inequality, if it is a > or $\geq$ inequality write as an "OR" inequality.

Example:

$|x+4| < 7$

$-7 < x+4 < 7$

$-4 \quad -4 \quad -4$

$-11 < x < 3$

$|x-1| \geq 8$

$x-1 \leq -8 \text{ or } x-1 \geq 8$

$+1 \quad +1 \qquad +1 \quad +1$

$x \leq -7 \quad \text{or} \quad x \geq 9$

21) $|x-1| < 8$

22) $|2x+4| \leq 6$

23) $|x+3| > 5$

24) $|x-1| \geq 7$

Write an equation of a line in Slope-intercept form $y = mx + b$.

The Slope Formula is: $m = \frac{y_2 - y_1}{x_2 - x_1}$

You can use either of the two methods:
Method one: $y = mx + b$ use the slope and a given point to determine b.
Given $m = 2$ and $(1, 3)$

$3 = 2(1) + b$

$3 = 2 + b$

$-2 \quad -2$

$1 = b$

The equation is $y = 2x + 1$

Method two: $(y - y_1) = m(x - x_1)$ this is the "point-slope" form.
Given $m = 2$ and $(1, 3)$

$y - 3 = 2(x - 1)$

$y - 3 = 2x - 2$

$+3 \qquad +3$

$y = 2x + 1$

The equation is $y = 2x + 1$

Use the given information to write the equation in Slope-intercept form.

25) $m = -2, (0, 4)$ 26) $m = 3, (1, 4)$ 27) $m = \frac{1}{2}, (4, -3)$

Use the given points to write the equation in Slope-intercept form.

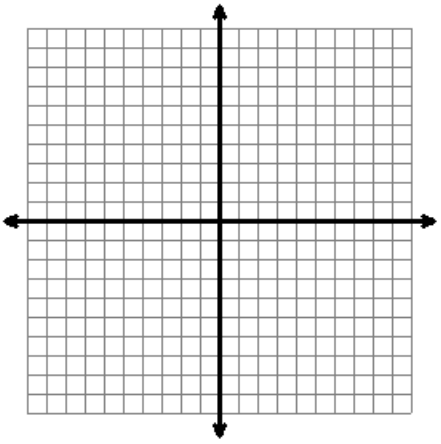
28) $(6, -3)$ *and* $(1, 7)$ 29) $(-1, -5)$ *and* $(2, 1)$ 30) $(1, 4)$ *and* $(-2, 1)$

Graphing lines.

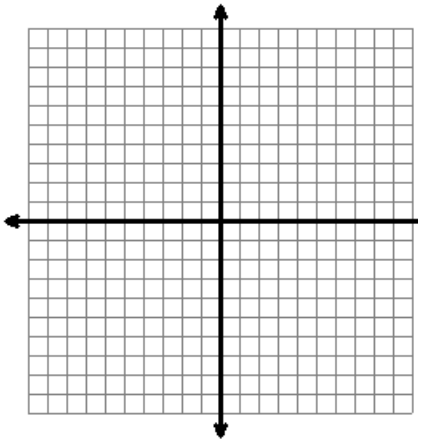
Method one: Create a table and determine two points. Method two: Plot the y-intercept and count the slope. Method three: Determine the x-intercept and y-intercept.

Graph.

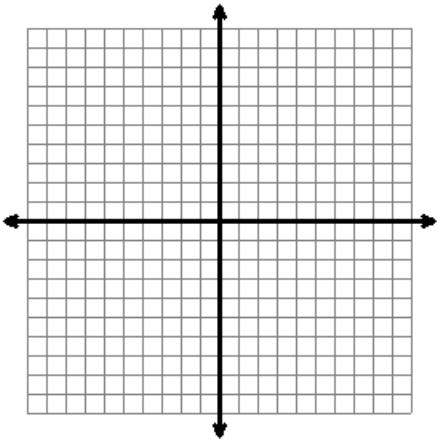
31) $y = 2x + 3$



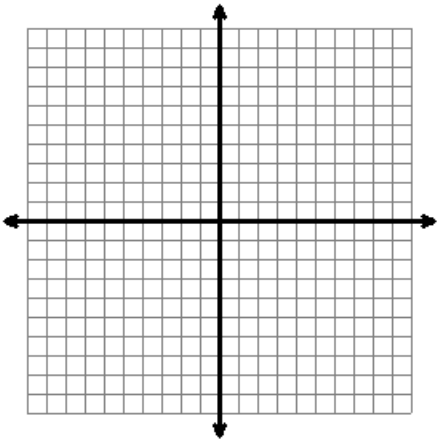
32) $y = -x - 5$



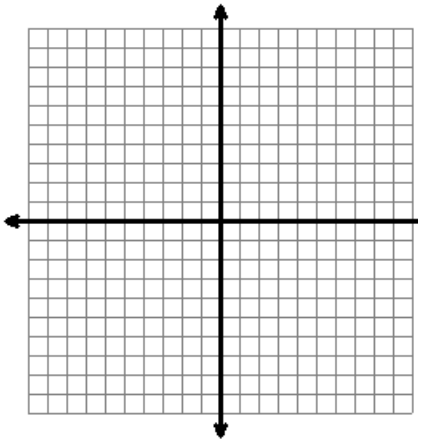
33) $y = -\frac{2}{3}x + 4$



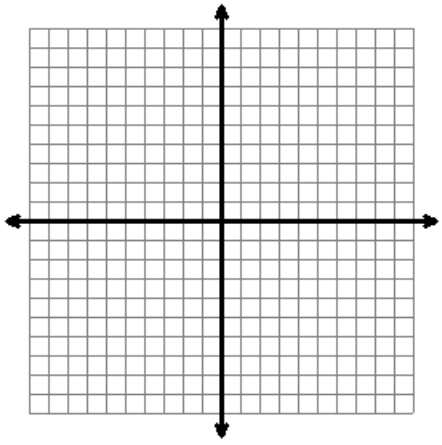
34) $2x + 3y = 6$



35) $5x - 3y = 15$



36) $2x + 5y = 4$



Solving Systems of equations.

Example:
Method one: Substitution method, used when at least one variable has a coefficient of positive or negative one.

$$\begin{cases} y = 2x + 5 \\ x + y = 2 \end{cases}$$

$$x + 2x + 5 = 2$$

$$3x + 5 = 2$$

$$-5 \quad -5$$

$$3x = -3$$

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

$$x = -1$$

$$y = 2(-1) + 5$$

$$y = -2 + 5$$

$$y = 3$$

solution: $(-1, 3)$

Solve the following systems.

37) $\begin{cases} y = -3x + 2 \\ y = 2x - 3 \end{cases}$

38) $\begin{cases} y = 5x + 2 \\ y = 3x \end{cases}$

39) $\begin{cases} y = -x + 3 \\ -x - 3y = -1 \end{cases}$

40) $\begin{cases} y = -3x - 13 \\ -x - 2y = -4 \end{cases}$

41) $\begin{cases} y = 2x - 10 \\ x - 4y = 5 \end{cases}$

42) $\begin{cases} -x + 6y = -12 \\ x + 6y = 12 \end{cases}$

Example:

Method two: Elimination method, used when none of the coefficients are positive or negative one.

$\begin{cases} 4x-2y=-16 \\ -3x+4y=12 \end{cases} \Rightarrow$ eliminate y so multiply the first equation by 2

$(4x-2y=-16)\bullet 2 \Rightarrow 8x-4y=-32$

$$\begin{array}{r} 8x-4y=-32 \\ + \\ -3x+4y=12 \\ \hline 5x \quad\quad =-20 \end{array}$$

$\frac{5x}{5}=\frac{-20}{5}$

$x=-4$

$4(-4)-2y=-16$

$-16-2y=-16$

$+16 \qquad +16$

$-2y=0$

$y=0$

solution: $(-4,0)$

43) $\begin{cases} 2x+6y=17 \\ 2x-10y=9 \end{cases}$

44) $\begin{cases} 3x-4y=-10 \\ 6x+3y=-42 \end{cases}$

45) $\begin{cases} 5x-3y=-3 \\ 2x+6y=0 \end{cases}$

46) $\begin{cases} 10x-2y=16 \\ 5x+3y=-12 \end{cases}$

47) $\begin{cases} 7x+2y=11 \\ -2x+3y=29 \end{cases}$

48) $\begin{cases} 4x-5y=13 \\ 6x+2y=48 \end{cases}$

Write Radicals in simplest form.

Example:
$\sqrt{75} = \sqrt{25 \bullet 3}$ Factor out perfect square
$\sqrt{25} \bullet \sqrt{3}$ Product property
$5\sqrt{3}$ Simplify

Simplify.

49) $\sqrt{8}$

50) $\sqrt{48}$

51) $\sqrt{75}$

52) $\sqrt{80}$

53) $\sqrt{45}$

54) $\sqrt{72}$

Solving a quadratic equation using the Quadratic Formula.

The Quadratic Formula:
Let *a*, *b*, and *c* be real numbers such that $a \neq 0$. The solutions of the quadratic equation $ax^2 + bx + c = 0$ are $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$.

Solve the following equations.

55) $x^2 + 3x - 2 = 0$

56) $x^2 - 6x + 7 = 0$

57) $3x^2 + 7x + 3 = 0$

58) $3x^2 - 8x - 9 = 0$

59) $12x^2 + 10x - 5 = 0$

60) $-3x^2 - 6x + 10 = 0$