



Ocean Township High School Mathematics Department

These are important topics from Algebra 1 that you must be comfortable doing before you can be successful in Algebra 2.

If you find that you need some assistance, please feel free to Google or YouTube the concepts. Within the directions of each problem, you will see key words that you should be using in your research.

- 1) Evaluate the expression.

$$3x^2 + 2xy \text{ if } x = -3 \text{ \& } y = -4$$

$$3(-3)^2 + 2(-3)(-4)$$

$$27 + 24$$

$$\boxed{51}$$

- 2) Evaluate the expression.

$$xy \div x(x - y) \text{ if } x = -6 \text{ \& } y = 2$$

$$-12 \div -6(-6 - 2)$$

$$-12 \div 48$$

$$\boxed{-\frac{1}{4}}$$

- 3) Combine the like terms.

$$8x^2 - 12x^3 + 3x^2 + 5x^3$$

$$\boxed{-7x^3 + 11x^2}$$

- 4) Solve the linear equation.

$$2x - 9 = 25$$

$$2x = 34$$

$$\boxed{x = 17}$$

- 5) Solve the linear equation.

$$\frac{x}{3} - 7 = 11$$

$$3 \cdot \frac{x}{3} = 18 \cdot 3$$

$$\boxed{x = 54}$$

6) Solve the linear equation.

$$x + 4x - 6 = 30$$

$$5x - 6 = 30$$

$$5x = 36$$

$$x = \frac{36}{5}$$

7) Solve the linear equation.

$$2(x + 4) = 11$$

$$2x + 8 = 11$$

$$2x = 3$$

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

8) Solve the linear equation.

$$6(x + 2) + 3(3x - 2) = 21$$

$$6x + 12 + 9x - 6 = 21$$

$$15x + 6 = 21$$

$$15x = 15$$

$$x = 1$$

9) Solve the linear equation.

$$5x - 3(3x + 1) - 8x = 45$$

$$5x - 9x - 3 - 8x = 45$$

$$-12x = 48$$

$$x = -4$$

10) Solve the linear equation.

$$11x = 9x + 14$$

$$2x = 14$$

$$x = 7$$

11) Solve the linear equation.

$$2x + 8 = 14 - 10x$$

$$12x = 6$$

$$x = \frac{1}{2}$$

12) Solve the linear equation.

$$12(3 + x) = 5(2x + 8)$$

$$36 + 12x = 10x + 40$$

$$2x = 4$$

$$x = 2$$

13) Solve the linear equation.

$$8x + 5 - 2x = 11 + 7x + x$$

$$6x + 5 = 11 + 8x$$

$$-6 = 2x$$

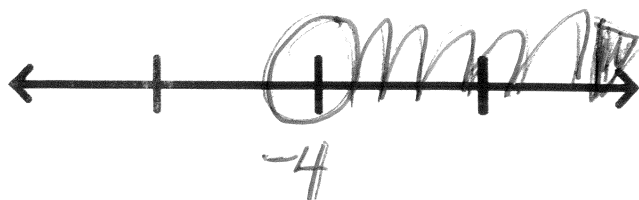
$$x = -3$$

- 14) Solve the inequality & graph the solution set.

$$3x + 2 > -10$$

$$3x > -12$$

$$x > -4$$



- 15) Solve the inequality & graph the solution set.

$$2(3 - x) \geq 8$$

$$3 - x \geq 4$$

$$-x \geq 1$$

$$x \leq -1$$

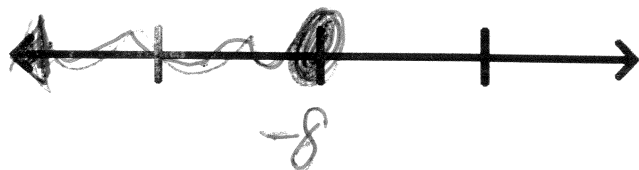


- 16) Solve the inequality & graph the solution set.

$$-2x + 9 \geq 25$$

$$-2x \geq 16$$

$$x \leq -8$$



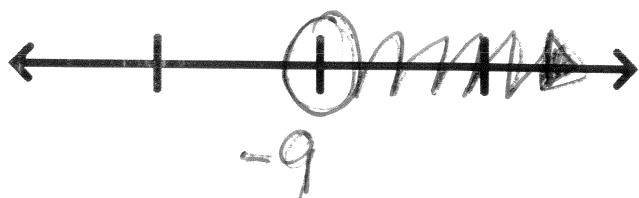
- 17) Solve the inequality & graph the solution set.

$$3x - 7 < 6x + 20$$

$$-7 < 3x + 20$$

$$-27 < 3x$$

$$-9 < x$$



- 18) Solve the absolute value equation.

$$|x - 7| = 11$$

$$x - 7 = 11$$

$$x = 18$$

$$x - 7 = -11$$

$$x = -4$$

19) Solve the absolute value equation.

$$3|x - 4| + 2 = 20$$

$$x - 4 = 6$$

$$x - 4 = -6$$

$$x = 10 \quad x = -2$$

20) Solve the absolute value equation.

$$|x + 2| - 6 = -19$$

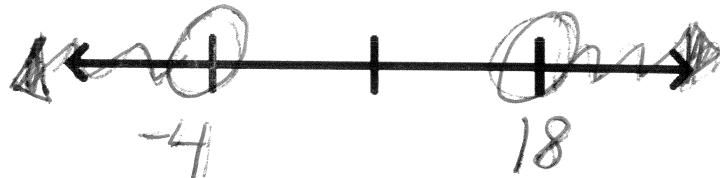
no solution!

21) Solve the absolute value inequality & graph the solution set.

$$|x - 7| > 11$$

$$x - 7 > 11 \quad \text{OR} \quad x - 7 < -11$$

$$x > 18 \quad \text{OR} \quad x < -4$$

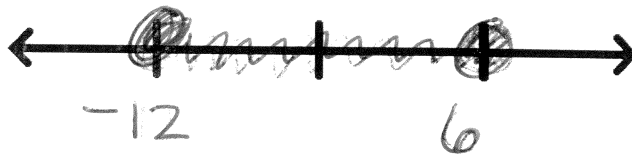


22) Solve the absolute value inequality & graph the solution set.

$$|x + 3| \leq 9$$

$$-9 \leq x + 3 \leq 9$$

$$-12 \leq x \leq 6$$

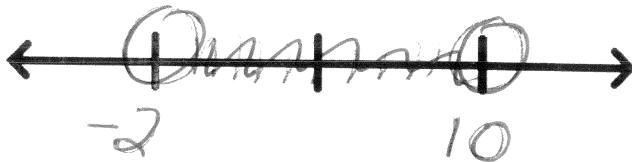


23) Solve the absolute value inequality & graph the solution set.

$$3|x - 4| + 2 < 20$$

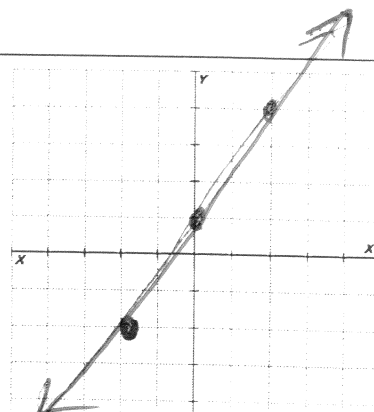
$$-6 < x - 4 < 6$$

$$-2 < x < 10$$



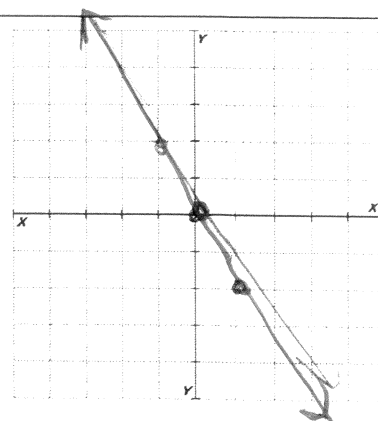
24) Graph the linear equation (slope-intercept form).

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



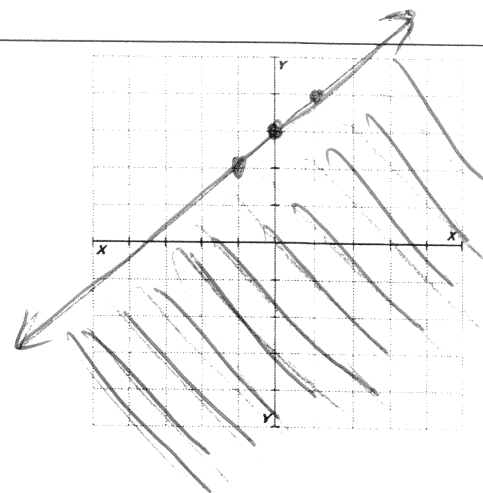
25) Graph the linear equation (slope-intercept form).

$$y = -2x$$



26) Graph the linear inequality (slope-intercept form).

$$y \leq x + 3$$

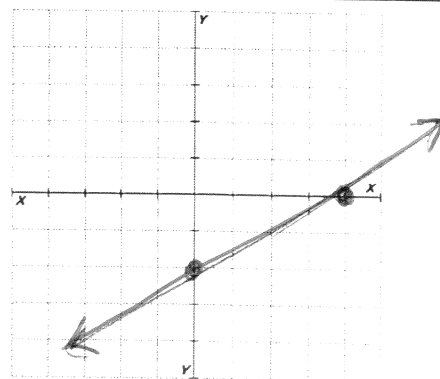


27) Graph the linear equation (standard form).

$$3x - 6y = 12$$

$$\frac{x}{int} \\ x = 4$$

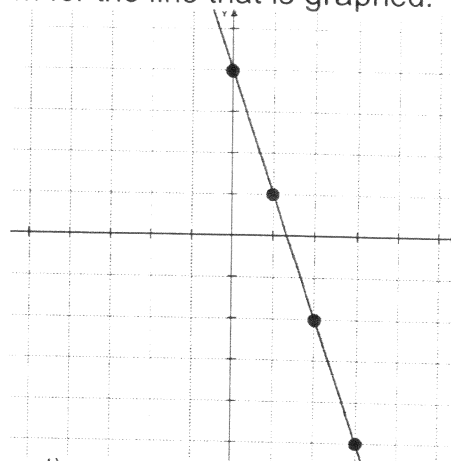
$$\frac{y}{int} \\ y = -2$$



28) Write the equation in slope-intercept form and standard form for the line that is graphed.

Slope-intercept form $y = -3x + 4$

Standard form $3x + y = 4$



29) Determine the slope of the line that goes through the points.

$(-5, 6) \text{ \& } (2, -15)$

$$\frac{-15-6}{2-(-5)} = \frac{-21}{7}$$

$$m = -3$$

30) Determine the slope of the line that goes through the points.

$(-11, -7) \text{ \& } (-11, 3)$

$$\frac{3-(-7)}{-11-(-11)}$$

$$m = \text{undefined}$$

31) Find the slope-intercept equation for a line with the given properties.

Slope = $\frac{3}{4}$ & containing the point $(-8, -16)$

$$y + 16 = \frac{3}{4}(x + 8)$$

$$y + 16 = \frac{3}{4}x + 6$$

$$y = \frac{3}{4}x - 10$$

32) Find the slope-intercept equation for a line with the given properties.

Containing the points $(4, -4) \text{ \& } (-6, 21)$

$$\frac{21-(-4)}{-6-4} = \frac{25}{-10} \quad m = -\frac{5}{2}$$

$$y + 4 = -\frac{5}{2}(x - 4)$$

$$y + 4 = -\frac{5}{2}x + 10$$

$$y = -\frac{5}{2}x + 6$$

33) Find the slope-intercept equation for a line with the given properties.

Parallel to $y = -2x + 7$ & containing the point $(-7, 6)$

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

$$y - 6 = -2x - 14$$

$$y = -2x - 8$$

34) Find the slope of the line perpendicular to the line containing the points.

$(2, -5) \text{ \& } (-6, -9)$

$$\frac{-9-(-5)}{-6-2} = \frac{-4}{-8}$$

$$m = \frac{1}{2}$$

$$\perp m = -2$$

35) Simplify using properties of exponents.

$$\frac{3 \times 18 \times x^3 \times x^2}{2 \times x \times x^{10} \times y^3}$$

$$\frac{3x^2}{2y^3}$$

36) Simplify using properties of exponents.

$$(4xy^7)^2(-3x^5y^2)$$
$$16x^2y^{14}$$

$$-48x^7y^{16}$$

37) Simplify using properties of exponents.

$$\frac{-8x^{-3}y^{-7}z^5}{12x^{-1}y^{10}z^{-6}}$$

$$\frac{-2z^{11}}{3x^2y^{17}}$$

38) Multiply the polynomials.

$$(3x-4)(2x-1)$$

$$6x^2 - 3x - 8x + 4 = 6x^2 - 11x + 4$$

39) Factor the polynomial (greatest common factor).

$$30x - 18y + 12$$

$$6(5x - 3y + 2)$$

40) Factor the polynomial.

$$x^2 + 10x + 16$$

$$(x+2)(x+8)$$

41) Factor the polynomial.

$$x^2 + 10x - 24$$

$$(x+12)(x-2)$$

42) Factor the polynomial.

$$2x^2 - 5x - 12$$

$$-2x^2 + 5x + 12$$

$$(x-4)(2x+3)$$

43) Factor the polynomial.

$$9x^2 - 100$$

$$(3x+10)(3x-10)$$

44) Factor the polynomial.

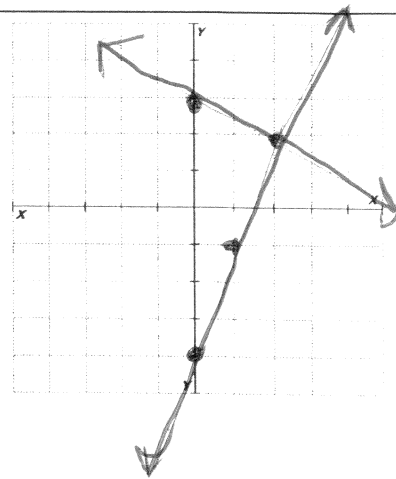
$$3x^3 - 12x$$

$$3x(x^2-4) \rightarrow 3x(x+2)(x-2)$$

45) Solve the system of equations by graphing.

$$\begin{cases} y = 3x - 4 \\ y = -\frac{1}{2}x + 3 \end{cases}$$

$$(2, 2)$$



46) Solve the system of equations by using substitution or elimination.

$$\begin{cases} y = 5x - 1 \\ 2x - y = -2 \end{cases}$$

$$x = 1$$

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

$$y = 4$$

$$2x - (5x - 1) = -2$$

$$2x - 5x + 1 = -2$$

$$-3x = -3$$

$$(1, 4)$$

47) Solve the system of equations by using substitution or elimination.

$$\begin{cases} x + y = 5 \\ x - y = 11 \end{cases}$$

$$2x = 16$$

$$x = 8 \quad y = -3$$

$$(8, -3)$$

48) Simplify the radical.

$$\sqrt{28}$$

$$2\sqrt{7}$$

49) Multiply the radicals and simplify.

$$\sqrt{5} \cdot \sqrt{5}$$

$$5$$

50) Multiply the radicals and simplify.

$$3\sqrt{8} \cdot 2\sqrt{6}$$

$$6\sqrt{48} \\ \sqrt{16}\sqrt{3}$$

$$24\sqrt{3}$$

51) Add the radicals.

$$4\sqrt{7} - 5\sqrt{3} - 6\sqrt{3} + 8\sqrt{7}$$

$$12\sqrt{7} - 11\sqrt{3}$$

52) Add the radicals.

$$3\sqrt{8} + 5\sqrt{18}$$

$$\sqrt{4}\sqrt{2} \quad \sqrt{9}\sqrt{2}$$

$$6\sqrt{2} + 15\sqrt{2}$$

$$21\sqrt{2}$$

53) Evaluate the function notation.

$$h(x) = 4x^2 - 3x + 11$$

$$4(-3)^2 - 3(-3) + 11$$

$$36 + 9 + 11$$

$$\text{Find } h(-3) = 56$$

54) Find the value of x in the function notation equation.

$$f(x) = 2x - 7$$

Find x so that $f(x) = -5$

$$2x - 7 = -5$$

$$2x = 2$$

$$x = 1$$