19 Things You Need to Know To Pass the Algebra 1 EOC

1) **Independent Variable** the letter that you can control; your **Input**
   
   Examples: the “x” in \( y = mx + b \); the “r” in \( A = \pi r^2 \)

2) **Dependent Variable** the letter that is by itself; your **Output**
   
   Examples: the “y” in \( y = mx + b \); the “A” in \( A = \pi r^2 \); The distance you travel depends on the rate and time of which you travel, the “D” in \( D = rt \)

3) **Slope** rate of change; rise over run; change in “y” divided by the change in “x”;

   See your formula chart: \( m = \frac{(y_2 - y_1)}{(x_2 - x_1)} \); the “m” in \( y = mx + b \); how far a graph goes up and over from one point to another

4) **x-intercept(s)** point(s) where a graph crosses the x-axis; also known as zero(s) or root(s); ordered pair(s) where the y coordinate is zero;

   example if \( 4x + 3y = 12 \), then the x-intercept would be \((3, 0)\)

5) **y-intercept(s)** point(s) where a graph crosses the y-axis; ordered pair(s) where the x coordinate is zero; example if \( 4x + 3y = 12 \), then the y-intercept would be \((0, 4)\); the “b” in \( y = mx + b \); example if \( y = 2x - 5 \), then the y-intercept is \((0, -5)\)

6) **Domain** the set of independent variables; the “x’s”; read a graph from left to right

7) **Range** the set of dependent variables; the “y’s”; read a graph from bottom to top
8) **Function** a graph that passes a vertical line test; a set of ordered pairs in which the “x’s” don’t repeat

9) **Linear Function** a function (equation) that makes a non-vertical straight line and has a constant rate of change (slope), examples: f(x) = -2x + 3, or 5x – 2y = 8; **Parent Function**: y = x

10) **Quadratic Function** a function or equation involving x^2 that makes a parabola (a “U” shape), which does not have a constant rate of change (slope), examples: f(x) = 2x^2 + 4x - 5 or y = ax^2 + c; **Parent Function**: y = x^2

11) **Exponential Function** a function that has a common multiple or divisor between terms, f(x) = a(b)^x; doubling or halving

12) **Inverse Variation** x⋅y = a constant value; y = a/x

13) **Inequalities** when solving if you multiple or divide by a negative change (flip) the inequality; when graphing follow these 4 rules:
   i) if y > the graph is be dotted and shaded above,
   i i) if y ≥ the graph is be solid and shaded above,
   iii) if y < the graph is be dotted and shaded below,
   iv) if y ≤ the graph is be solid and shaded below,

14) **Distributive Property** the number and the sign in front of a parenthesis must be multiplied by everything inside the parenthesis example: 4(x + 2) – 3(x – 5)
equals $4(x) + 4(2) + -3(x) + -3(-5) = 4x + 8 – 3x + 15 = x + 23$

15) **Value of a function** means substitute or plug a number in for “x” and do the indicated operations to find the value (answer); find the value of $f(x) = 2x^2 – 5x$ if $x = -3$ or $f(-3); 2(-3)^2 – 5(-3) = 2(9) + 15 = 18 + 15 = 33$

16) **Transformations involving $y = ax^2 + c$** the bigger the “a” is the faster the ends of the graph go up if “a” is positive or down if “a” is negative, the graph becomes more narrow; the smaller the “a” is the slower the ends of the graph go up if “a” is positive or down if “a” is negative, the graph becomes wider; the “c” makes the whole graph go up or down but does not change the size

17) **Exponent rules** i) when you multiply common variables add their exponents, example: $(2x^2) (5x^3) = 10 x^{(2+3)} = 10 x^5$
   ii) when you divide common variables subtract their exponents, example: $(8x^6) / (4x^3) = 2 x^{(6-3)} = 2 x^3$
   iii) any variable or number raised to the zero (0) is one, example: $(2x^2)^0 = 1$
   iv) when you have a power raised to a power multiply the exponents, example: $(2x^3)^2 = 4x^{(3 \times 2)} = 4x^6$

18) **Parallel** lines that have the same slope but different y-intercepts; lines that never intersect

19) **Perpendicular** lines that have opposite reciprocal slopes; example if one line’s slope is -1/2 then the other line’s slope would be 2; lines that intersect at a 90 degree angle