

2016 – 2017 NC Math 1 - Things to Remember!

LINEAR EQUATIONS

$y = mx + b$	Slope Intercept Form (Slanted)
$y = \#$	Horizontal line
$x = \#$	Vertical line
$Ax + By = C$	Standard Form
$y - y_1 = m(x - x_1)$	Point Slope Form

Slope

$$\text{slope (m)} = \frac{\text{rise}}{\text{run}} \quad \text{Use when given the graph}$$

$$\text{slope (m)} = \frac{y_2 - y_1}{x_2 - x_1} \quad \text{Use when given 2 points}$$

Parallel lines:	same slopes
Perpendicular lines:	opposite reciprocal slopes
Slanted line	slope = fraction or integer

Horizontal line slope = 0 \longleftrightarrow

Vertical line slope = undefined \updownarrow

Intercepts

To find an x – intercept: substitute /replace “y” in the equation with 0

To find a y – intercept: substitute /replace “x” in the equation with 0

STATISTICS

Mean = \bar{x} = sum of data \div number of data points
also described as the “average”

Appropriate center when no outliers

Measure of Spread: Standard Deviation

Median = center value when data is listed from least to greatest (if there are two centers, use the mean of those two)

Appropriate center when outliers.

Measure of Spread: IQR

Outliers = Values are unlike the rest of the data.

Use $(1.5) \cdot \text{IQR}$ rule to find outliers.

5 Number Summary = Minimum, 1st Quartile Q_1 , Median, 3rd Quartile (Q_3), Maximum

IQR Interquartile Range = $Q_3 - Q_1$

Range = Maximum – Minimum

FUNCTIONS

The graph passes the vertical line test. It is a set of ordered pairs in which every element x has only one y element associated with it.

If $f(x) = 3x + 4$ then find $f(2)$

$f(2) = 3(2) + 4 = 10$ so $f(2) = 10$ a.k.a. (2, 10)

QUADRATIC EQUATIONS

$ax^2 + bx + c = 0$ Standard Form Equation

$y = ax^2 + bx + c$ Quadratic form of a parabola

Shape

- Graph is a parabola (has maximum or minimum)
- Positive a–value creates a “ U ” shape (min)
- Negative a–value creates a “ \cap ” shape (max)

Solutions

- Also called zeros and x–intercepts
- Can be found by substituting y or $f(x)$ with “0” and then factoring. Set each factor = 0.
- In calculator, press 2nd trace zero to find zeros

Vertex

- The max or min point (x, y)
- Vertex (x, y) means: x is what it takes to reach the max height, y is the maximum height
- In calculator, press 2nd trace maximum or minimum to find the vertex

Axis of Symmetry (AOS)

- a vertical line drawn through the vertex, the center of parabola & crosses through the x - axis
- equation: $x = \#$ (the x-value in the vertex point)
- parabola increases and decreases at $x < \text{AOS } \#$ or $x > \text{AOS } \#$

FACTORING

- Binomial- find GCF, Difference of Two Squares
- Trinomial- Look for a GCF, Box/Bust Method
- 4 Terms- Look for a GCF, Grouping Method

EXPONENT RULES

$$(-3)^2 \neq -3^2 \quad x^2 \cdot x^3 = x^{2+3} \quad (x^3)^2 = x^{3 \cdot 2}$$

$$x^{-2} = \frac{1}{x^2} \quad \frac{x^5}{x^2} = x^{5-2} \quad x^0 = 1$$

EXPONENTIAL EQUATIONS

$$y = a(b)^{\left(\frac{x}{n}\right)} \quad a = \text{initial value}$$
$$y = a(1+r)^{\left(\frac{x}{n}\right)} \quad \% \text{ Growth}$$
$$y = a(1-r)^{\left(\frac{x}{n}\right)} \quad \% \text{ Decay}$$

$(1+r) = \text{growth factor (b)}$
 $(1-r) = \text{decay factor (b)}$
 $x = \text{total time}$
 $n = \text{growth/decay time}$

SCATTER PLOT STEPS

1. **Clears the Memory:** Press 2^{ND} $+$ 7 1 2
2. **Enter data in the calculator:** Press STAT , ENTER to *EDIT* and enter data. X's in L_1 and Y's in L_2
3. **Turn data points ON (graph):** Press 2^{ND} , $y=$ ENTER , ENTER **STATPLOT is now on**
4. **To see the graph:** Press ZOOM , 9 (Zoomstat)
* if the points do not appear, ensure you did step 3
5. **Turn diagnostic on (r-value/correlation coefficient):**
Press 2^{ND} 0 (catalog), and find *DiagnosticOn*
Press ENTER , ENTER
6. **Create lines of best fit:** Press STAT , \rightarrow (Calc),
Press 4 (Linreg) for straight line ENTER
Press 0 (Expreg) for exponential curve ENTER

SOLVING EQUATIONS

1. Deal with any parenthesis in the problem
2. Combine similar terms on same side of = sign
3. Get the needed variables on the same side of the = sign
4. Isolate the needed variable by add/subtract
5. Find the needed variable by multiply/divide

SOLVING INEQUALITIES

$$5-3x \leq 13+x \quad \text{*Don't forget to flip the sign when}$$
$$-3x \leq 8+x \quad \text{you multiply or divide by a}$$
$$-4x \leq 8 \quad \text{negative number}$$
$$x \geq -2$$

SOLVING SYSTEMS OF EQUATIONS

Graphing- Solve both equations for "y" (get $y = mx + b$ form). Graph them on the same grid to find the point of intersection solution (x,y). If lines are parallel then, no solution. If lines are same then, the equation is the solution.

Substitution- Solve an equ for 1 variable; substitute it into the other equation & solve to get the first value; plug that value into 1 of the original equations to get the 2nd value. Write the answer as an ordered pair (x, y).

Elimination- Put both equations in standard form & get the same variable to have same coefficient but opposite signs. Add the 2 equations together to get the 1st value. Plug that value into 1 of the original equations to get the 2nd value. Write the answer as an ordered pair (x, y).

GEOMETRY

Midpoint Formula

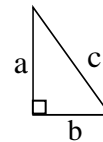
$$M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right) \quad \text{Use to find the middle}$$

pt of a segment given 2 pts: (x_1, y_1) and (x_2, y_2)

Pythagorean Theorem

$$a^2 + b^2 = c^2$$

Use to find the length/distance between 2 points.



Distance Formula:

$$D = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

Use to find the length of a segment given 2 points: (x_1, y_1) and (x_2, y_2)



Area: $\triangle A = \frac{1}{2}bh$ $\square A = L \cdot W$

SOLVING QUADRATICS BY FACTORING

1. Put Equation in Standard Form (= 0)
2. Factor
3. Set the factors equal to 0
4. Solve for x