ACT Notes

**Sets of numbers:**

Integers – {…, -3, -2, -1, 0, 1, 2, 3, …}

Rational Numbers – Any # that can be written as a fraction of two integers

Irrational Numbers – #’s that are not rational (examples - )

Real Numbers – Any number on the number line (rational and irrationals)

**Linear Equations:**

General Form: 

Point/Slope Form: 

Slope/Intercept Form: 

 *m* = slope

 *b* = y-int 

**Slope** between 2 points: 

**Parallel** lines – same slope

**Perpen**. lines – negative reciprocal slopes

 (for example: 2/3 and –3/2)

**Vertical** Lines: *m* = undefined

 Equation: *x* = #

**Horizontal** Lines: *m* = 0

#  Equation: *y* = #

**Intercepts:**

*x*-intercept: set  and solve for *x*: intercept = ( *x*, 0)

*y*-intercept: set  and solve for *y*: intercept = ( 0, *y*)

**Transformations:**

 Let *c* be a positive real number, and be a function:

###### Shifts

###### Up →  Right →

 Down →  Left → 

###### Stretches/Shrinks

 Vertical Stretch →  where c > 1

 Vertical Shrink →  where 

 Horizontal Stretch →  where 

 Horizontal Shrink →  where c > 1

**Flips (Reflections)**

 Over *x*-axis →  Over *y*-axis → 

**Quadratic Equations (Parabolas):**

General Form: 

Vertex:  (also equation of axis of symmetry)

 Plug *x* into original equation to find the corresponding *y*-coordinate

Vertex Form:  vertex = 

**Quadratic Equations**:

Any quadratic equations can be written as: 

**Quadratic** **Formula**: 

**Sum** of roots =  **Product** of roots = 

The **discriminant** *b*2 - 4*ac* will tell what kind of roots (solutions) the equation has.

 If discriminant is Positive (> 0), then there are 2 real, unequal solutions

 Zero (= 0), then there is 1 real solution (repeated)

 Negative (< 0), then there are 0 real solutions

(2 imaginary, complex conjugate solutions)

**Imaginary numbers:**



Complex number form: 



**Exponents:**

 

 

 

**Logarithms**: $log\_{b}x=y$ *means* $b^{y}=x$

**Properties**: 1. 

 2. 

 3. 

**Direct Variation**: *y* varies directly as *x*: $y=kx$

*y* varies inversely as *x*: $y=\frac{k}{x}$

**Formulas:**

Distance =  Midpoint = 

**Circle:**  Center = 

 Radius = *r*

**SOH-CAH-TOA :**







**Reciprocal identities:**







**Quotient Identities:**





**Pythagorean Identities:**







**Area of a Triangle**: $A=\frac{1}{2}absinC$

**Law of Sins**: $\frac{sinA}{a}=\frac{sinB}{b}=\frac{sinC}{c}$

**Law of Cosines**: $a^{2}=b^{2}+c^{2}-2(bc)cosA$

**Sum of the interior angles** of a polygon = 

**Each interior angle** of an regular polygon =  \*where *n* = # of sides

**Number of Diagonals** of a polygon = $\frac{n(n-3)}{2}$

**Area of a Sector**: $A=\frac{angle}{360}πr^{2}$

**Arc Length**: Arc Length $=\frac{angle}{360}2πr$

**Circles**: $A=πr^{2}$ $C=2πr$ or $C=πd$

**Trapezoid**: $A=\frac{1}{2}\left(b\_{1}+b\_{2}\right)h$

**Parallelogram**: $A=bh$ (base and height are perpendicular to each other)

**Cylinder**: $V=πr^{2}h$

\*\*Two sides of a triangle add up to more than the third side.

**Measures of sets of quantities:**

Arithmetic **Mean** (Average) – sum of all terms/number of terms

**Median** – middle # : put the numbers in order and find the middle one.

 (If there are 2, find the average of them)

**Mode** – number that appears most often

How many way to arrange 4 classes = $4×3×2×1=24$

**% of change** (increase or decrease): 

**Sum of arithmetic series**: 

**Rate/Time/Distance**: Rate $×$ Time = Distance

**Profit/Revenue**: Profit = Revenue – Cost

Revenue = Price $×$ Number of units