The Ultimate Formula Sheet for QUANT

Area of a Circle: $A = \pi r^2$

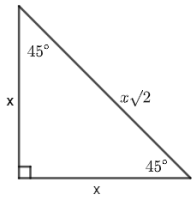
Circumference of a Circle: $C = 2\pi r$

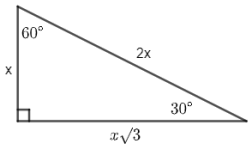
Area of a Rectangle: $A = lw$

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

Pythagorean Theorem: $a^2 + b^2 = c^2$

Special Right Triangles:





Volume of a Rectangular Prism (Box): $V = lwh$

Volume of a Cylindar: $V = \pi r^2 h$

Volume of a Sphere: $V = \frac{4}{3}\pi r^3$

Volume of a Cone: $V = \frac{1}{3}\pi r^2 h$

Volume of a Pyramid: $V = \frac{1}{3}lwh$

Fractions, Decimals, and Percentages: (for this section, r is the percent in decimal form)

$Fraction = \frac{part}{whole}$

$percent = \frac{part}{100}$

Percent Increase or Decrease:

$\frac{|old - new|}{old} \times 100\%$

Increase by a percent: multiply by $(1+r)$

Decrease by a percent: multiply by $(1-r)$

Simple Interest: $A = P(1+rt)$

Interest Compounded Annually: $A = P(1+r)^t$

Interest Compounded n times per year:

$A = P\left(1 + \frac{r}{n}\right)^{nt}$

Exponents, Roots, & Polynomials:

Multiplication Rule for Exponents: $a^b \cdot a^c = a^{b+c}$

Division Rule for Exponents: $\frac{a^b}{a^c} = a^{b-c}$

Power Rule for Exponents: $\left(a^b\right)^c = a^{bc}$

Negative Exponents: $a^{-b} = \frac{1}{a^b}$

Fractional Exponents: $a^{\frac{b}{c}} = \sqrt[c]{a^b} \; or \left(\sqrt[c]{a}\right)^b$

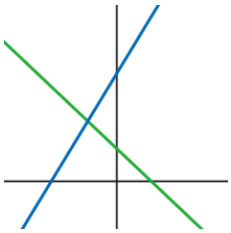
$i^2 = -1$; $i^3 = -i$; $i^4 = 1$

Perfect Square Trinomial: $a^2 + 2ab + b^2 = (a+b)^2$ and $a^2 - 2ab + b^2 = (a-b)^2$

Difference of Squares: $a^2 - b^2 = (a+b)(a-b)$

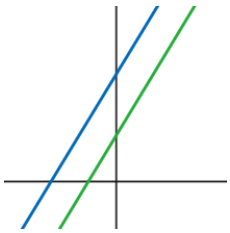
Completing the Square: $x^2 + bx + \left(\frac{b}{2}\right)^2 = \left(x + \frac{b}{2}\right)^2$

Systems of Linear Equations



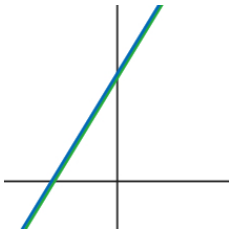
One solution: The lines intersect at one point.

If the slopes of two lines are different.



No solutions: The lines intersect nowhere.

If the slopes of two lines are the same (they are parallel) but the y-intercept is different.



Infinite Solutions: The lines intersect at infinite points (they are overlapping lines).

If the slopes and y-intercepts are the same for both lines.

Parabolas:

Standard Form: $f(x)=ax^2+bx+c$;

vertex= $\left(-\frac{b}{2a}, f\left(-\frac{b}{2a}\right)\right)$;

y-intercept = c;

x-intercepts = $\frac{-b\pm\sqrt{b^2-4ac}}{2a}$

Sum of solutions = $\frac{-b}{a}$

Discriminant = b^2-4ac; Pos=2 real roots Zero= 1 real root; Neg=2 imaginary roots

Factored Form: $f(x)=a(x-m)(x-n)$;

x-intercepts are m and n;

x-coordinate of vertex = $\frac{m+n}{2}$

Polygons: (for this section, n is the number of sides)

Area of a trapezoid: $\frac{1}{2}(b_1+b_2)h$

Sum of the interior angles: $180(n-2)$

Sum of the exterior angles: 360°

Properties of Parallelogram

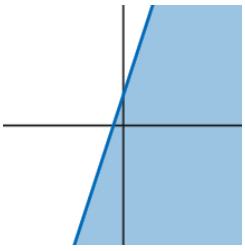
1. Opp sides are ∥ and ≅
2. Opp ∠' s are ≅
3. Consec ∠'s are supplementary
4. Each diagonal forms a pair of ≅Δ's
5. Diagonals bisect each other

➔If they are ≅ it is a rectangle

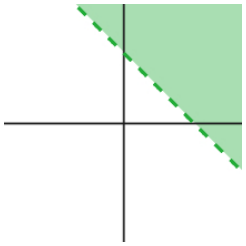
➔If they are ⊥ it is a rhombus

6. $Area=base\times height$

Systems of Linear Inequalities



$y \leq 3x + 1$



$y > -x + 2$

$y \leq 3x + 1$ and $y > -x + 2$ graphed together. The solution is the overlapping region.

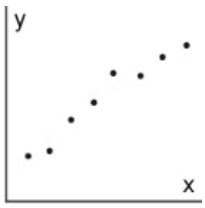
Data and Probability:

$$average = \frac{sum\_of\_items}{number\_of\_items}$$

$$median = middle\_number$$

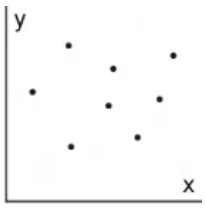
$$range = \text{max}imum - \text{min}imum$$

$$probability = \frac{desired\_outcomes}{possible\_outcomes}$$

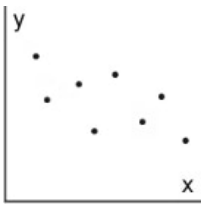


Strong positive association

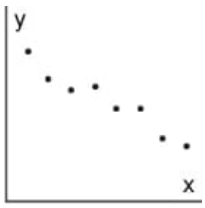
Weaker positive association



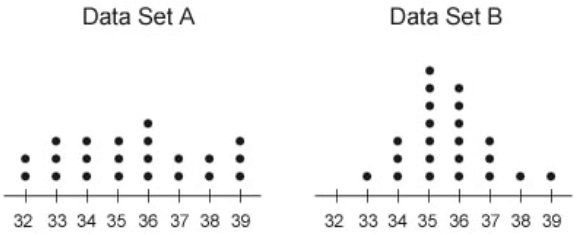
No association



Weaker negative association



Strong negative association



Data Set A has a **larger standard deviation** than Data Set B since the values are spread farther from the mean in general for Data Set A than for Data Set B.

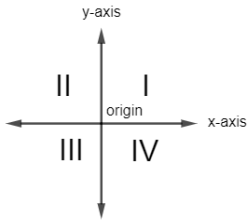
Sample Size: A sample size of 30 is considered large enough to make accurate calculations for any size population. Still, the larger the sample, the more accurate the statistics are that can be calculated from it.

Graphing Lines:

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

Slope of horizontal line = 0

Slope of vertical line = undefined



Standard Form: $Ax + By = C$

Slope-Intercept Form: $y = mx + b$

Point-Slope Form: $y - y_1 = m(x - x_1)$

Distance Formula: $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

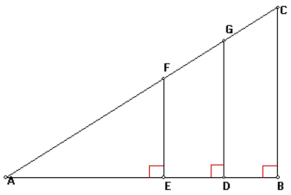
Midpoint Formula: $M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$

Parallel lines: equal slopes

⊥ Lines: slopes are opposite reciprocals

Similar Triangles

A/E = B/F = C/G



Angles:

Vertical ∠' s are ≅

∠'s that form a linear pair are supplementary (add up to 180°)

∠' s that form a circle add up to 360°

When ∥ lines are cut by a transversal, all acute ∠' s are ≅ and all obtuse ∠' s are ≅

Triangles:

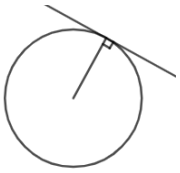
The three ∠' s of a Δ add up to 180°

An exterior ∠ is equal to the sum of the two remote interior ∠' s

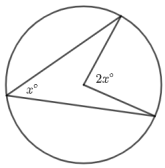
Pythagorean Triples: 3-4-5 and 5-12-13

Circles:

A radius and tangent make a right ∠



A central ∠ is double the inscribed ∠



$\frac{x}{360} = \frac{arc}{circumference}$ and $\frac{x}{360} = \frac{sector}{area\_of\_circle}$ where x = central angle