ACT & SAT Math Formula & Notes Sheet

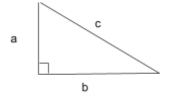
by Mario's Math Tutoring (YouTube Channel)

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

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

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

Pythagorean Theorem: $a^2 + b^2 = c^2$ (Common **Pythagorean Triples:** <u>3-4-5</u>, <u>5-12-13</u>, <u>8-15-17</u>, <u>7-24-25</u> or multiples of these)



SOH CAH TOA

$$\sin \theta = \frac{opposite \ side}{hypotenuse}$$
 $\cos \theta = \frac{adjacent \ side}{hypotenuse}$

$$\tan \theta = \frac{opposite \ side}{adjacent \ side}$$
 $\csc \theta = \frac{1}{sin\theta}$

$$\sec \theta = \frac{1}{sec\theta}$$
 $\cot \theta = \frac{1}{tan\theta}$

$$sin^2\theta + cos^2\theta = 1$$

$$sin(90 - \theta) = cos\theta$$
 $cos(90 - \theta) = sin\theta$

Standard Form of the Equation of a Circle:

$$(x-h)^2 + (y-k)^2 = r^2$$

(h,k) Center of the circle and r is radius

Equations of Parabolas:

 $y = ax^2 + bx + c$ remember $x = \frac{-b}{2a}$ is the x-coordinate of vertex and is the axis of symmetry.

$$y = a(x - h)^2 + k$$
 vertex form (h,k) vertex
 $y = a(x - p)(x - q)$ intercept form (p,0),(q,0) x-intercepts

Expected Value:

$$\sum_{i=1}^{n} x_{i} P(x_{i})$$

(Sum up the outcome of an event multiplied the probability of it happening for each possible outcome.)

Imaginary Numbers:

$$i = \sqrt{-1}$$
$$i^2 = -1$$

Average(mean):

$$Average = \frac{Total}{\#Items}$$

ACT & SAT Math Formula & Notes Sheet

by Mario's Math Tutoring (YouTube Channel)

Probability:

$$P = \frac{\# Successes}{Total \ Possible \ Outcomes}$$

Logs:

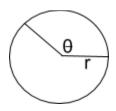
$$\log_b x = n$$
 is equivalent to $b^n = x$

Arc Length:

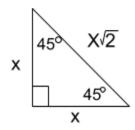
$$arc\ length = \frac{\theta}{360}\ (2\pi r)$$

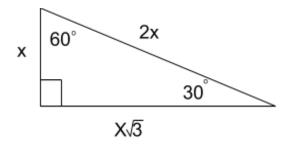
Area of Sector:

area of sector =
$$\frac{\theta}{360}$$
 (πr^2)



Special Right Triangles:





Percent of Change = $\frac{amount \ of \ change}{original \ amount}$

Rules of Exponents:

$$x^{m} \cdot x^{n} = x^{m+n}$$

$$\frac{x^{m}}{x^{n}} = x^{m-n}$$

$$(x^{m})^{n} = x^{m \cdot n}$$

$$x^{0} = 1$$

$$x^{-m} = \frac{1}{x^{m}}$$

$$x^{m/n} = \sqrt[n]{x^{m}} \text{ or } (\sqrt[n]{x})^{m}$$

Quadratic Formula & Discriminant:

If
$$ax^2 + bx + c = 0$$
 then
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$
if $b^2 - 4ac > 0$ then 2 real solutions
if $b^2 - 4ac = 0$ then 1 real solutions
if $b^2 - 4ac < 0$ then 0 real solutions, 2 imaginary

Area of Circle:

$$A = \pi r^2$$

Circumference of Circle:

$$C = 2\pi r$$
 or $C = \pi d$

Volume of Cylinder:

$$V = \pi r^2 h$$

Free ACT & SAT Math Video Tutorials available on Mario's Math Tutoring YouTube Channel to help boost your scores.

Feel free to copy, share, & distribute this ACT/SAT study sheet giving attribution to Mario's Math Tutoring(YouTube Channel)

ACT & SAT Math Formula & Notes Sheet

by Mario's Math Tutoring (YouTube Channel)

Other Topics helpful to know/study:

- Similar triangles
- Proportions
- Order of Operations (PEMDAS)
- Fractions & Mixed Numbers
- Imaginary & Complex Numbers
- Square Roots & Radicals
- Greatest Common Factor (GCF)
- Least Common Multiple (LCM)
- Isosceles & Equilateral Triangles
- Laws of Logic & Conditional Statements
- Functions
- Inequalities & Special Cases
- Foiling Binomials & Factoring
- Equations of Lines(y=mx + b)
- Multiplication Counting Principle
- Perimeter & Area Problems
- Writing Linear Combinations
- Scientific Notation
- Permutations, Combinations & Factorials
- Systems of Equations
- Translating Sentences into Equations
- Absolute Value Equations & Inequalities
- Quadrilaterals
- One to One Property of Exponents
- Circles & Angles

- Law of Sines & Law of Cosines
- Median, Mean, Mode, basic Statistics
- Angle Problems, Parallel lines cut by Transversal
- Rewriting Equations "in terms of"
- Piecewise Functions
- Unit Conversions
- Multiplying Matrices & Basics of Matrices
- Unit Circle
- Direct Variation
- Extended Ratios
- Graphing Parabolas
- Percentages
- Types of Numbers (Rational, Irrational, etc.)
- Venn Diagrams
- Rationalizing Denominators
- Completing the Square
- Solving Radical Equations
- Graphing Lines & Inequalities
- Polynomials Zeros, Factors, Remainders
- Polynomial Long Division
- Rational Exponents
- Exponential Functions

Free videos covering all these topics available on Mario's Math Tutoring YouTube Channel