ACT MATH FORMULA REVIEW

College Finance and Planning: CLASS 101

Roots, Powers and Exponents

$A^0 = 1$

$A^1 = A$

$\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$

$\sqrt{ab} = \sqrt{a}\sqrt{b}$

$A^m A^n = A^{m+n}$

$(A^m)^n = A^{mn}$

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

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

$A^{\frac{m}{n}} = \sqrt[n]{A^m}$

$\log_a a^x = x \quad (\log_2 8 = \log_2 2^3 = 3)$

$\log_a(xy) = \log_a x + \log_a y$

$\log_a\left(\frac{x}{y}\right) = \log_a x - \log_a y$

Quadratic Formula

$Ax^2 + bx + c = 0$

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

Distance Time Formula

$Speed\ (v) = \frac{Distance\ (d)}{Time\ (t)} \quad v = \frac{d}{t}$

Linear Equations

$y = mx + b$

y intercept is b (x=0)

X intercept is $mx + b = 0$ (y=0)

The slope is $m = \frac{y_2 - y_1}{x_2 - x_1}$

The line with a perpendicular slope has an opposite reciprocal of m: $-\frac{1}{m}$

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

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

Prime numbers

Can be divided only by 1 and themselves.

First ten primes: 2,3,5,7,11,13,17,19,23,29

(O and 1 are not primes)

Perfect squares

Commonly used on the ACT:

11^2=**121**; 12^2=**144**; 13^2=**169**;

14^2=**196**; 15^2=**225**; 16^2=**256**; 25^2=**625**

Irrational numbers

Cannot be written as a ratio of two integers: Examples π, √2, √3, etc.

$\pi * \pi = \pi^2$ (irrational); √2*√2=2 (rational!)

Imaginary Numbers

When squared, gives a negative result

$i * i = -1 \quad i = \sqrt{-1} \quad \sqrt{(-x)} = i\sqrt{x}$

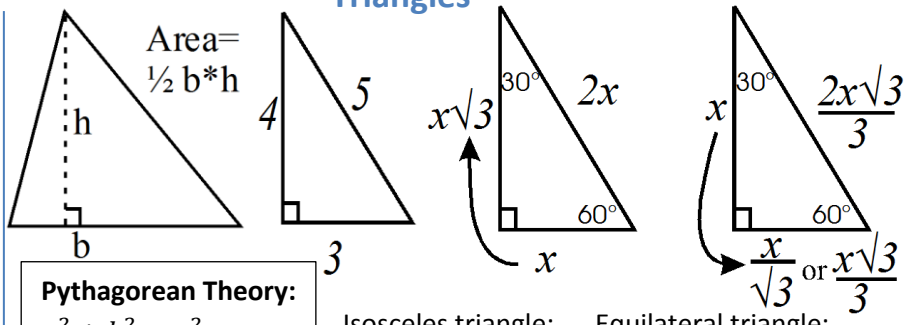
$i^1 = i; i^2 = -1;\ i^3 = -i\ ;\ i^4 = 1; i^5 = i^1$

Mean: Average ‖ **Median**: Middle number

Mode: Most frequent number

Weighted average: Add the values for each occurrence; divide by total occurrences.

Triangles

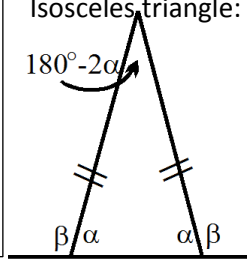


Pythagorean Theory:

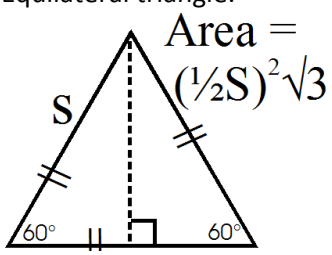
$a^2 + b^2 = c^2$

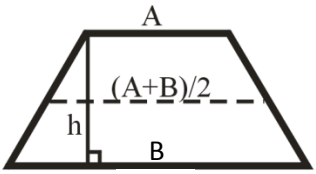
3,	4,	5
5,	12,	13
6,	8,	10
7,	24,	25
8,	15,	17

Isosceles triangle:



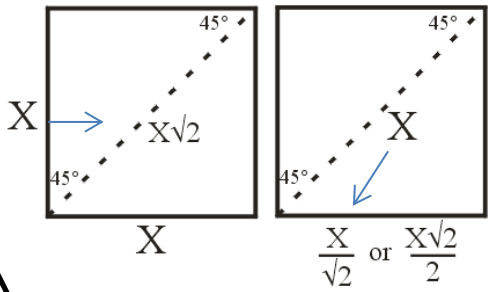
Equilateral triangle:





Area of a trapezoid:

Half-point line: (A+B)/2 * h



CIRCLE

Area = πr^2

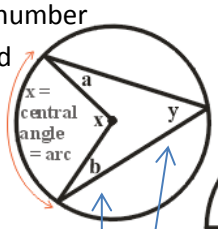
Formula:

$x^2 + y^2 = r^2$

$(x-a)^2 + (y-b)^2 = r^2$

→Midpoint = (a,b); radius = r

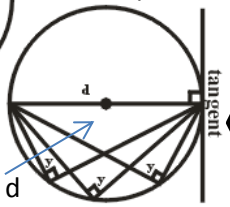
Perimeter = $2\pi r$



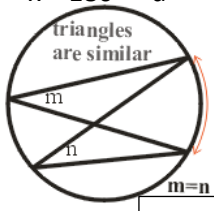
a+b = y = ½x

y = inscribed angle = ½x

y = 90° ==> x = 180° = d



Sum of angles in a regular polygon with n sides: **180 (n-2)**

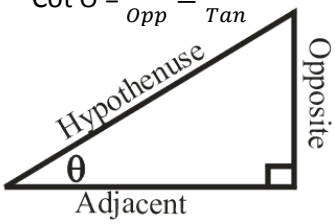


TRIGONOMETRY: SOH-CAH-TOA

Sin Θ = $\frac{Opp}{Hyp}$ Csc Θ = $\frac{Hyp}{Opp} = \frac{1}{Sin}$

Cos Θ = $\frac{Adj}{Hyp}$ Sec Θ = $\frac{Hyp}{Adj} = \frac{1}{Cos}$

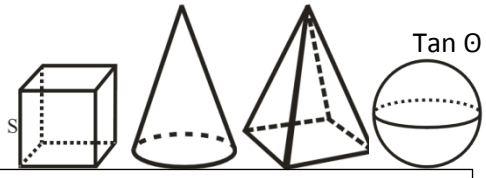
Tan Θ = $\frac{Opp}{Adj}$ Cot Θ = $\frac{Adj}{Opp} = \frac{1}{Tan}$



CYLINDER:

Area: $\pi r^2 + \pi r^2 + h * 2\pi r$

Volume: $\pi r^2 * h$



Volume: Cube: V = s^3 Cone: V = 1/3 πr^2 h

Pyramid: V = 1/3 lwh Sphere: V= 4/3 π r^3

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$\log_a a^x =$ ___
$\log_a(xy) =$ ___
$\log_a\left(\frac{x}{y}\right) =$ ___

Quadratic Formula

$Ax^2 + bx + c = 0$

➔ $x =$ ____

Distance-Time Formula

D = ___ * ___ T= $\frac{?}{?}$ ____

Linear Equations

$y = mx + b$

y intercept is _____
X intercept is _____
The slope $m = \frac{?}{?}$ _____

The line with a perpendicular slope has a slope of _____

Distance Formula $d =$ _____

Midpoint Formula _____

Prime numbers

Definition: _____

First ten primes: _____

Perfect squares

Commonly used on the ACT:

11^2=____; 12^2=____; 13^2=____;
14^2= ___; 15^2=____; 16^2=____; 25^2=___

Irrational numbers

Definition: _____

Examples: _____

Imaginary Number,

Definition: _____

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

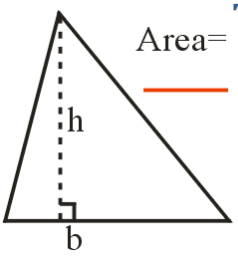
Mean: _____

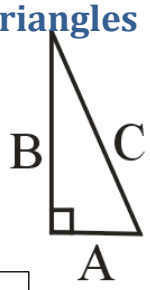
Median: _____

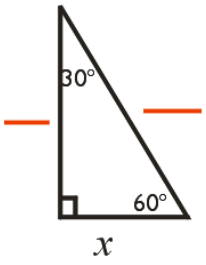
Mode: _____

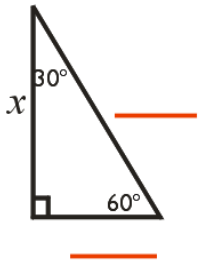
Weighted average: _____

Triangles







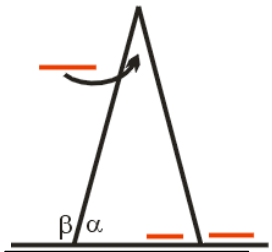


Pythagorean Theory:

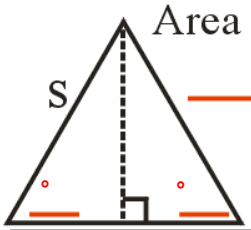
Formula: _____

Examples:

3, ___ , ___
5, ___ , ___
6, ___ , ___
7, ___ , ___
8, ___ , ___



Isosceles triangle

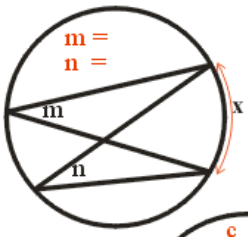


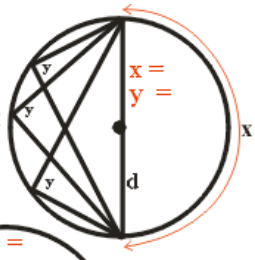
Equilateral triangle

CIRCLE:

Area = _____

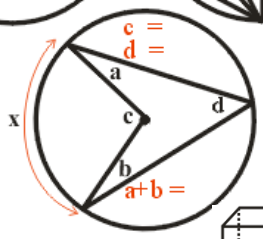
Perimeter = _____





Formula:

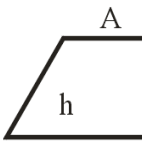
____ + ____ = __



CYLINDER:

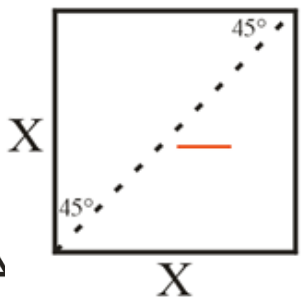
Area: _____

Volume: _____

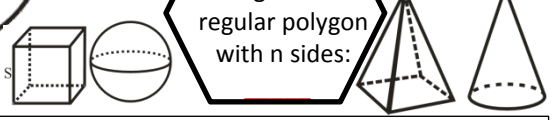


Area of a trapezoid:

_____



Sum of angles in a regular polygon with n sides: _____



Volume: Cube: V = Cone: V =
Pyramid: V = Sphere: V=

TRIGONOMETRY:

Sin Θ = ___
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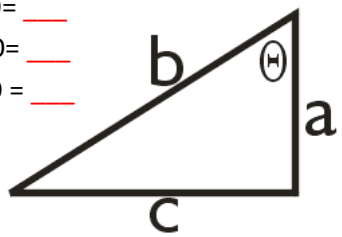

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