

ACT MATH FORMULA REVIEW

Roots, Powers and Exponents

$A^0 = 1$ $A^1 = A$ $\sqrt[n]{\frac{a}{b}} = \frac{\sqrt[n]{a}}{\sqrt[n]{b}}$ $\sqrt{ab} = \sqrt{a}\sqrt{b}$ $A^m A^n = A^{m+n}$ $(A^m)^n = A^{mn}$ $\frac{A^m}{A^n} = A^{m-n}$ $A^{-m} = \frac{1}{A^m}$ $\frac{m}{A^n} = \sqrt[n]{A^m}$	$\log_a a^x = x$ ($\log_2 8 = \log_2 2^3 = 3$) $\log_a(xy) = \log_a x + \log_a y$ $\log_a\left(\frac{x}{y}\right) = \log_a x - \log_a y$ Quadratic Formula $Ax^2 + bx + c = 0$ $\rightarrow x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ Distance Time Formula $Speed (v) = \frac{Distance (d)}{Time (t)}$ $v = \frac{d}{t}$	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 $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$
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Prime numbers

Can be divided only by 1 and themselves.
 First ten primes: 2,3,5,7,11,13,17,19,23,29
 (0 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 , $\sqrt{2}$, $\sqrt{3}$, etc.
 $\pi * \pi = \pi^2$ (irrational); $\sqrt{2} * \sqrt{2} = 2$ (rational!)

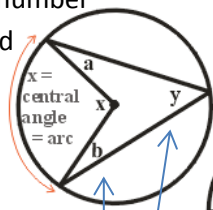
Imaginary Numbers

When squared, gives a negative result
 $i * i = -1$ $i = \sqrt{-1}$ $\sqrt{-x} = i\sqrt{x}$
 $i^1 = i$; $i^2 = -1$; $i^3 = -i$; $i^4 = 1$; $i^5 = i^1$

Mean: Average || **Median:** Middle number

Mode: Most frequent number

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



CIRCLE

Area = πr^2

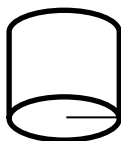
Formula:

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

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

\rightarrow Midpoint = (a,b); radius = r

Perimeter = $2\pi r$



CYLINDER:

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

Volume: $\pi r^2 * h$

Triangles

Area = $\frac{1}{2} b * h$

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: $180^\circ - 2\alpha$

Equilateral triangle: Area = $(\frac{1}{2}S)^2 \sqrt{3}$

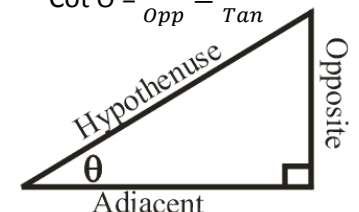
Area of a trapezoid:
 Half-point line: $(A+B)/2 * h$

X
 $X\sqrt{2}$
 $\frac{X}{\sqrt{2}}$ or $\frac{X\sqrt{2}}{2}$

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

TRIGONOMETRY: SOH-CAH-TOA

$$\begin{aligned} \sin \theta &= \frac{Opp}{Hyp} & \csc \theta &= \frac{Hyp}{Opp} = \frac{1}{\sin} \\ \cos \theta &= \frac{Adj}{Hyp} & \sec \theta &= \frac{Hyp}{Adj} = \frac{1}{\cos} \\ \tan \theta &= \frac{Opp}{Adj} & \cot \theta &= \frac{Adj}{Opp} = \frac{1}{\tan} \end{aligned}$$



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



Roots, Powers and Exponents

$A^0 =$ _____ $A^1 =$ _____ $\sqrt[b]{-} =$ _____ $\sqrt{ab} =$ _____ $A^m A^n =$ _____ $(A^m)^n =$ _____ $\frac{Am}{An} =$ _____ $A^{-m} =$ _____ $\frac{m}{An} =$ _____	$\log_a a^x =$ _____ $\log_a(xy) =$ _____ $\log_a\left(\frac{x}{y}\right) =$ _____ <h3 style="color: #4a90e2;">Quadratic Formula</h3> $Ax^2 + bx + c = 0$ $\rightarrow x =$ _____ <h3 style="color: #4a90e2;">Distance-Time Formula</h3> $D =$ _____ * _____ $T = \frac{?}{?}$ _____	<h3 style="color: #4a90e2;">Linear Equations</h3> $y = mx + b$ 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 _____
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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: _____

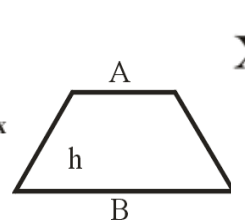
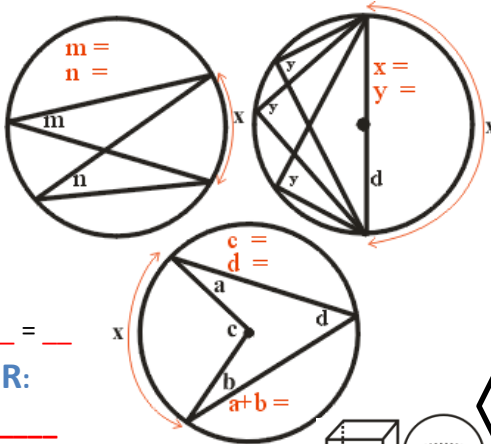
CIRCLE:

Area = _____

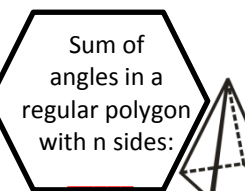
Perimeter = _____

Formula: _____

_____ + _____ = _____

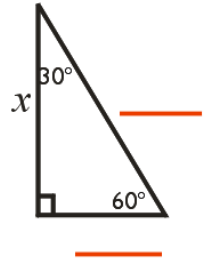
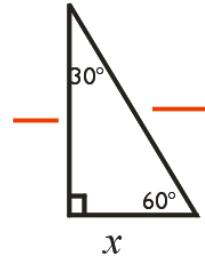
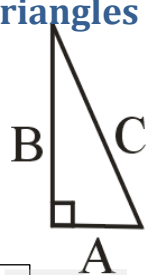
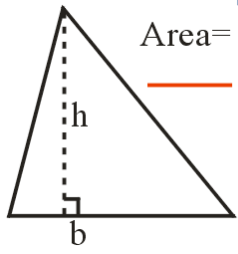


Area of a trapezoid: _____

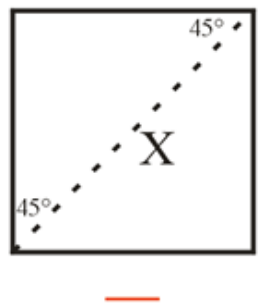
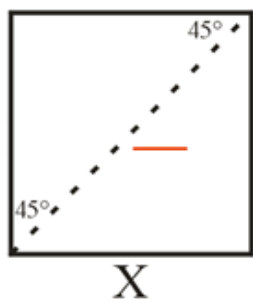
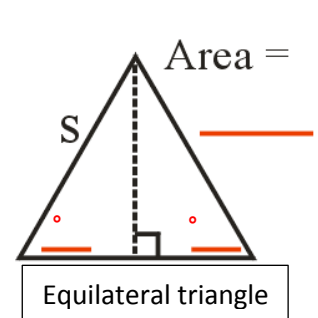
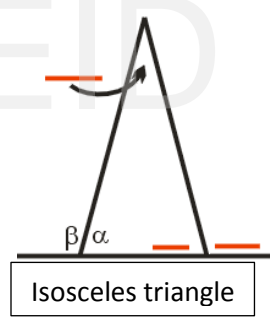


Volume: Cube: $V =$ _____	Cone: $V =$ _____
Pyramid: $V =$ _____	Sphere: $V =$ _____

Triangles



Pythagorean Theory:
 Formula: _____
 Examples:
 3, _____, _____
 5, _____, _____
 6, _____, _____
 7, _____, _____
 8, _____, _____



TRIGONOMETRY:

- Sin $\theta =$ _____
- Sec $\theta =$ _____
- Cos $\theta =$ _____
- Cot $\theta =$ _____
- Csc $\theta =$ _____
- Tan $\theta =$ _____

