






Algebra 1 End-of-Course and Geometry End-of-Course Assessments Reference Sheet

	Area	
Parallelogram	$A = bh$	
Triangle	$A = \frac{1}{2}bh$	
Trapezoid	$A = \frac{1}{2}h(b_1 + b_2)$	
Circle	$A = \pi r^2$	
Regular Polygon	$A = \frac{1}{2}aP$	

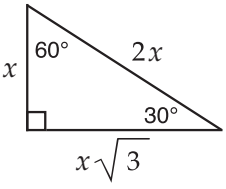
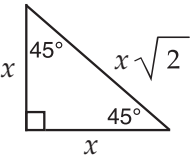
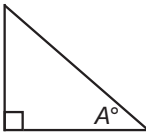
KEY	
b = base	A = area
h = height	B = area of base
w = width	C = circumference
d = diameter	V = volume
r = radius	P = perimeter
ℓ = slant height	of base
a = apothem	S.A. = surface area
Use 3.14 or $\frac{22}{7}$ for π .	

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

	Volume/Capacity	Total Surface Area
	Rectangular Prism $V = bwh$ or $V = Bh$	$S.A. = 2bh + 2bw + 2hw$ or $S.A. = Ph + 2B$
	Right Circular Cylinder $V = \pi r^2 h$ or $V = Bh$	$S.A. = 2\pi r h + 2\pi r^2$ or $S.A. = 2\pi r h + 2B$
	Right Square Pyramid $V = \frac{1}{3}Bh$	$S.A. = \frac{1}{2}P\ell + B$
	Right Circular Cone $V = \frac{1}{3}\pi r^2 h$ or $V = \frac{1}{3}Bh$	$S.A. = \frac{1}{2}(2\pi r)\ell + B$
	Sphere $V = \frac{4}{3}\pi r^3$	$S.A. = 4\pi r^2$

Sum of the measures of the interior angles of a polygon = $180(n-2)$
Measure of an interior angle of a regular polygon = $\frac{180(n-2)}{n}$
where: n represents the number of sides

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<p style="text-align: center;">Slope formula</p> $m = \frac{y_2 - y_1}{x_2 - x_1}$ <p>where m = slope and (x_1, y_1) and (x_2, y_2) are points on the line</p>	<p style="text-align: center;">Distance between two points</p> <p>$P_1(x_1, y_1)$ and $P_2(x_2, y_2)$</p> $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
<p style="text-align: center;">Slope-intercept form of a linear equation</p> $y = mx + b$ <p>where m = slope and b = y-intercept</p>	<p style="text-align: center;">Midpoint between two points</p> <p>$P_1(x_1, y_1)$ and $P_2(x_2, y_2)$</p> $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$
<p style="text-align: center;">Point-slope form of a linear equation</p> $y - y_1 = m(x - x_1)$ <p>where m = slope and (x_1, y_1) is a point on the line</p>	<p style="text-align: center;">Quadratic formula</p> $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ <p>where a, b, and c are coefficients in an equation of the form $ax^2 + bx + c = 0$</p>
<p style="text-align: center;">Special Right Triangles</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>30-60-90 triangle: legs x and $x\sqrt{3}$, hypotenuse $2x$.</p> </div> <div style="text-align: center;">  <p>45-45-90 triangle: legs x and x, hypotenuse $x\sqrt{2}$.</p> </div> </div>	<p style="text-align: center;">Trigonometric Ratios</p> <div style="display: flex; align-items: center;">  <div> $\sin A^\circ = \frac{\text{opposite}}{\text{hypotenuse}}$ $\cos A^\circ = \frac{\text{adjacent}}{\text{hypotenuse}}$ $\tan A^\circ = \frac{\text{opposite}}{\text{adjacent}}$ </div> </div>

Conversions	
<ul style="list-style-type: none"> 1 yard = 3 feet 1 mile = 1,760 yards = 5,280 feet 1 acre = 43,560 square feet 1 hour = 60 minutes 1 minute = 60 seconds 	<ul style="list-style-type: none"> 1 cup = 8 fluid ounces 1 pint = 2 cups 1 quart = 2 pints 1 gallon = 4 quarts 1 pound = 16 ounces 1 ton = 2,000 pounds
<ul style="list-style-type: none"> 1 meter = 100 centimeters = 1000 millimeters 1 kilometer = 1000 meters 1 liter = 1000 milliliters = 1000 cubic centimeters 1 gram = 1000 milligrams 1 kilogram = 1000 grams 	

Algebra – Things to Remember!



Scientific Notation: 3.2×10^{13} The first number must be $1 \leq n < 10$		Exponents: $(-3)^2 \neq -3^2$ $x^m \cdot x^n = x^{m+n}$ $2^0 = 1$ $(x^n)^m = x^{n \cdot m}$ $4^{-3} = \frac{1}{4^3}$ $\frac{x^m}{x^n} = x^{m-n}$ $(xy)^n = x^n \cdot y^n$		Properties of Real Numbers: Commutative Property: $a + b = b + a$ $ab = ba$ Associative Property: $a+(b+c) = (a+b)+c$ $a(bc) = (ab)c$ Distributive Property: $a(b+c) = ab + ac$ Identity: $a + 0 = a$ $a \cdot 1 = a$ Inverse: $a + (-a) = 0$ $a \cdot (1/a) = 1$ Zero Property: $a \cdot 0 = 0$							
Factorial: $5! = 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1$ $1! = 1$ FYI: $0! = 1$	Absolute Value: $ -5 = 5$ $ 5 = 5$ Represents distance	Undefined: $\frac{6}{7-x}$ is undefined when $x = 7$ since the denominator = 0.		Polygons and sides: triangle – 3 octagon – 8 quadrilateral – 4 nonagon – 9 pentagon – 5 decagon – 10 hexagon – 6 dodecagon – 12 septagon – 7							
Multiply: (distribute or FOIL) $(x+3)(x+2) = x \cdot x + x \cdot 2 + 3 \cdot x + 3 \cdot 2$ $= x^2 + 5x + 6$ $(a+b)^2 = a^2 + 2ab + b^2$ $(a-b)^2 = a^2 - 2ab + b^2$		Direct Variation: $y = kx$ where $k =$ constant of variation $k = y/x$		Degree: Degree of monomial = sum of exponents $4x^3$ is of degree 3 x^2y^3 is of degree 5							
Add Fractions: Get the common denominator: $\frac{5x}{6} + \frac{3x}{2} = \frac{5x}{6} + \frac{9x}{6} = \frac{14x}{6} = \frac{7x}{3}$		Factor: Look for a GCF (greatest common factor) Factor binomial or trinomial. $a^2 - b^2 = (a+b)(a-b)$		Solving Equations: 1. Deal with any parentheses in the problem. 2. Combine similar terms on same side of = sign. 3. Get the needed variables on the same side of = sign. 4. Isolate the needed variable by add or subtract. 5. Find the needed variable by divide or multiply.							
Inequalities: $5 - 3x \leq 13 + x$ Remember to $-3x \leq 8 + x$ change direction $-4x \leq 8$ of inequality when $x \geq -2$ mult/div by a negative.		Factor: Look for a GCF (greatest common factor) Factor binomial or trinomial. $a^2 - b^2 = (a+b)(a-b)$		Quadratic Equation: $x^2 - 5x + 6 = 0$ Set = 0. $(x-3)(x-2) = 0$ Factor. $x = 3; x = 2$ Find roots							
Systems: <table border="1" style="width: 100%;"> <tr> <td>$y - 2x = 1$</td> <td rowspan="2"><i>Linear:</i> substitute; add to eliminate one variable or graph.</td> </tr> <tr> <td>$y + 2x = 9$</td> </tr> <tr> <td>$y = x^2 - x - 6$</td> <td rowspan="2"><i>Linear Quadratic:</i> substitute or graph</td> </tr> <tr> <td>$y = 2x - 2$</td> </tr> </table>		$y - 2x = 1$	<i>Linear:</i> substitute; add to eliminate one variable or graph.	$y + 2x = 9$	$y = x^2 - x - 6$	<i>Linear Quadratic:</i> substitute or graph	$y = 2x - 2$	Function: Passes the vertical line test. A set of ordered pairs in which each x element has only one y element associated with it. $f(x) = 3x + 4$ $f(3) = 3 \cdot 3 + 4 = 13$		Interval Notation: $(1, 5) \leftrightarrow 1 < x < 5$ $[1, 5] \leftrightarrow 1 \leq x \leq 5$	
$y - 2x = 1$	<i>Linear:</i> substitute; add to eliminate one variable or graph.										
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$y = 2x - 2$											
For inequality systems, graph.		Parallel and Perpendicular: Parallel: slopes are equal. Perpendicular: slopes are negative reciprocals (flip over and negate)		Parabola: $y = ax^2 + bx + c$ Axis of symmetry: $x = \frac{-b}{2a}$ Roots: where the graph crosses the x -axis.							
Equations of Lines: $m =$ slope $y = mx + b$ slope-intercept $y - y_1 = m(x - x_1)$ point-slope		Slope: $m = \frac{\text{vertical change}}{\text{horizontal change}} = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$		Undefined: $\frac{6}{7-x}$ is undefined when $x = 7$ since the denominator = 0.							

<p>Perimeter: add the distances around the outside.</p> <p>Circumference: $C = 2\pi r = \pi d$</p>	<p>Pythagorean Theorem: Right Triangles only. $c^2 = a^2 + b^2$ Triples: 3, 4, 5 5, 12, 13 8, 15, 17 7, 24, 25</p>	<p>Trig: Right triangles only $\sin \angle A = \frac{o}{h}$; $\cos \angle A = \frac{a}{h}$; $\tan \angle A = \frac{o}{a}$ Angle of elevation: from horizontal line of sight up. Angle of depression: from horizontal line of sight down.</p>
<p>Area:</p> $A_{\text{triangle}} = \frac{1}{2}bh$ $A_{\text{equilateral triangle}} = \frac{s^2\sqrt{3}}{4}$ $A_{\text{rectangle}} = bh$ $A_{\text{square}} = bh = s^2$ $A_{\text{parallelogram}} = bh$ $A_{\text{rhombus}} = bh = \frac{d_1 \cdot d_2}{2}$ $A_{\text{trapezoid}} = \frac{1}{2}h(b_1 + b_2)$ $A_{\text{circle}} = \pi r^2$ $A_{\text{sector of circle}} = \frac{n}{360}\pi r^2$ $A_{\text{semicircle}} = \frac{1}{2}\pi r^2$ $A_{\text{quarter circle}} = \frac{1}{4}\pi r^2$	<p>Volume and Surface Area:</p> $V_{\text{rectangular solid}} = l \cdot w \cdot h$ $SA_{\text{rectangular solid}} = 2lh + 2hw + 2lw$ $V_{\text{cylinder}} = \pi r^2 h$ $SA_{\text{closed cylinder}} = 2\pi rh + 2\pi r^2$ <p>Error in Measurement: Relative error = $\frac{\text{measure-actual}}{\text{actual}}$ % of Error = Relative • 100%</p> <p>Permutations: Arrangement in specific order. ${}_n P_r = \frac{n!}{(n-r)!}$</p>	<p>Data: 5 Statistical Summary: minimum, maximum, median, 1st quartile, 3rd quartile Quartiles divide data into 4 equal parts. Percentiles divide data into 100 equal parts. Percentile rank of score $x = \frac{\text{number of scores below } x}{n} \cdot 100$, where n is the number of scores. Mean = average. Mode = most often (may be more than one answer). Median = middle. Outliers = values that are far away from the rest of the data. Median best describes data if outliers exist. Range = difference between the maximum and minimum values.</p>
<p>Literal equations: $a = b + cd$, solve for c. $a - b = cd$ $\frac{a - b}{d} = c$ Use same strategies as for solving equations.</p>	<p>Sets: $A \cup B$ Union - all elements in both sets. $A \cap B$ Intersection - elements where sets overlap. A' Complement - elements not in the set. { } or \emptyset means null set.</p>	<p>Box and Whisker Plot: 1st and 3rd quartiles are at the ends of the box, median is a vertical line in the box, and the max/min are at the ends of the whiskers. Helpful in interpreting the distribution of data.</p> 