

## Reference Sheet for the QualityCore™ Algebra II End-of-Course Assessment

### Equations of a Line

Standard Form	$Ax + By = C$	$A$ , $B$ , and $C$ are constants with $A$ and $B$ not both equal to zero.
Slope-Intercept Form	$y = mx + b$	$(x_1, y_1)$ is a point.
Point-Slope Form	$y - y_1 = m(x - x_1)$	$m = \text{slope}$ $b = \text{y-intercept}$

### Quadratics

Standard Form of a Quadratic Equation	$ax^2 + bx + c = 0$	$a$ , $b$ , and $c$ are constants, where $a \neq 0$ .
Quadratic Formula	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	

### Conic Sections

Circle	$(x - h)^2 + (y - k)^2 = r^2$	center $(h, k)$ $r = \text{radius}$
Parabola	$y = a(x - h)^2 + k$	axis of symmetry $x = h$ vertex $(h, k)$ directrix $y = k - \frac{1}{4a}$ focus $(h, k + \frac{1}{4a})$
Parabola	$x = a(y - k)^2 + h$	axis of symmetry $y = k$ vertex $(h, k)$ directrix $x = h - \frac{1}{4a}$ focus $(h + \frac{1}{4a}, k)$
Ellipse	$\frac{(x - h)^2}{a^2} + \frac{(y - k)^2}{b^2} = 1$	foci $(h \pm c, k)$ where $c^2 = a^2 - b^2$ , center $(h, k)$
Ellipse	$\frac{(y - k)^2}{a^2} + \frac{(x - h)^2}{b^2} = 1$	foci $(h, k \pm c)$ where $c^2 = a^2 - b^2$ , center $(h, k)$
Hyperbola	$\frac{(x - h)^2}{a^2} - \frac{(y - k)^2}{b^2} = 1$	foci $(h \pm c, k)$ where $c^2 = a^2 + b^2$ , center $(h, k)$
Hyperbola	$\frac{(y - k)^2}{a^2} - \frac{(x - h)^2}{b^2} = 1$	foci $(h, k \pm c)$ where $c^2 = a^2 + b^2$ , center $(h, k)$

### Lines and Points

Slope	$m = \frac{y_2 - y_1}{x_2 - x_1}$	$(x_1, y_1)$ and $(x_2, y_2)$ are 2 points. $m = \text{slope}$
Midpoint	$M = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$	$M = \text{midpoint}$ $d = \text{distance}$
Distance	$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$	

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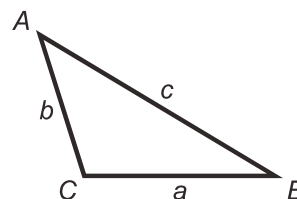
## Miscellaneous

Distance, Rate, Time	$D = rt$	$D$ = distance $r$ = rate $t$ = time
Simple Interest	$I = prt$	$I$ = interest $p$ = principal
Compound Interest	$A = p\left(1 + \frac{r}{n}\right)^{nt}$	$A$ = amount of money after $t$ years $n$ = number of times interest is compounded annually
Pythagorean Theorem	$a^2 + b^2 = c^2$	$a$ and $b$ = legs of right triangle $c$ = hypotenuse

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## Laws of Sines and Cosines

Law of Sines	$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$
Law of Cosines	$a^2 = b^2 + c^2 - 2bc \cos A$



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## Sequences, Series, and Counting

Arithmetic Sequence	$a_n = a_1 + (n - 1)d$	$a_n$ = $n^{\text{th}}$ term
Arithmetic Series	$s_n = \frac{n}{2}(a_1 + a_n)$	$n$ = number of the term $d$ = common difference
Geometric Sequence	$a_n = a_1(r^{n-1})$	$s_n$ = sum of the first $n$ terms $r$ = common ratio
Geometric Series	$s_n = \frac{a_1 - a_1 r^n}{1 - r}$ where $r \neq 1$	$k$ = number of objects in the set $m$ = number of objects selected
Combinations	${}_k C_m = C(k, m) = \frac{k!}{(k-m)! m!}$	
Permutations	${}_k P_m = P(k, m) = \frac{k!}{(k-m)!}$	

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## Circumference, Area, and Volume

Triangle	$A = \frac{1}{2}bh$	$A$ = area $b$ = base $h$ = height
Parallelogram	$A = bh$	$r$ = radius
Trapezoid	$A = \frac{1}{2}(b_1 + b_2)h$	$C$ = circumference $d$ = diameter
Circle	$A = \pi r^2$ $C = \pi d$	$V$ = volume
General Prism	$V = Bh$	$B$ = area of base $\pi \approx 3.14$
Right Circular Cylinder	$V = \pi r^2 h$	
Pyramid	$V = \frac{1}{3}Bh$	
Right Circular Cone	$V = \frac{1}{3}\pi r^2 h$	
Sphere	$V = \frac{4}{3}\pi r^3$	