QualityCore™

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 = slope b = 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 = radius	
Parabola	$y = a(x - h)^2 + k$	axis of symmetry $x = h$ directrix $y = k - \frac{1}{4a}$	vertex (h,k) focus $\left(h, k + \frac{1}{4a}\right)$
Parabola	$x = a(y - k)^2 + h$	axis of symmetry $y = k$ directrix $x = h - \frac{1}{4a}$	vertex (h,k) focus $\left(h + \frac{1}{4a}, k\right)$
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

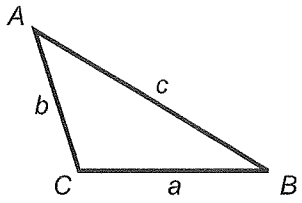
Slope	$m = \frac{y_2 - y_1}{x_2 - x_1}$	(x_1,y_1) and (x_2,y_2) are 2 points. m = slope
Midpoint	$M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$	M = midpoint d = distance
Distance	$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$	

Miscellaneous

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

Laws of Sines and Cosines

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



Sequences, Series, and Counting

Arithmetic Sequence	$a_n = a_1 + (n - 1)d$
Arithmetic Series	$s_n = \frac{n}{2}(a_1 + a_n)$
Geometric Sequence	$a_n = a_1(r^{n-1})$
Geometric Series	$s_n = \frac{a_1 - a_1 r^n}{1 - r}$ where $r \neq 1$
Combinations	${}_kC_m = C(k,m) = \frac{k!}{(k-m)!\,m!}$
Permutations	${}_kP_m = P(k,m) = \frac{k!}{(k-m)!}$

$a_n = n^{\text{th}}$ term
n = number of the term
d = common difference
s_n = sum of the first n terms
r = common ratio
k = number of objects in the set
m = number of objects selected

Circumference, Area, and Volume

Triangle	$A = \frac{1}{2}bh$
Parallelogram	$A = bh$
Trapezoid	$A = \frac{1}{2}(b_1 + b_2)h$
Circle	$A = \pi r^2$ $C = \pi d$
General Prism	$V = Bh$
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	$V = \frac{4}{3}\pi r^3$

A = area
b = base
h = height
r = radius
C = circumference
d = diameter
V = volume
B = area of base
$\pi \approx 3.14$

ACT®