College Algebra Exam Formulas Sheet

Some equation forms of a line:

$y = mx + b$ $\qquad$ $y - y_1 = m(x - x_1)$ $\qquad$ $\text{Ax} + \text{By} = \text{C}$

Some equation forms of a circle:

$(x - h)^2 + (y - k)^2 = r^2$ $\qquad$ $x^2 + y^2 + ax + by + c = 0$

Given a line passing through points (x_1, y_1) and (x_2, y_2), the slope m of the line is $m = \frac{rise}{run} = \frac{y_2 - y_1}{x_2 - x_1}$ as long as $x_2 \neq x_1$

The average rate of change of a function from a to b is $\frac{f(b) - f(a)}{b - a}$

Some equation forms of a parabola:

$y = f(x) = a(x - h)^2 + k$ $\qquad$ $y = ax^2 + bx + c$, with vertex $\left(-\frac{b}{2a},\ c - \frac{b^2}{4a}\right)$

The Law of Exponents:

Given $a > 0$ with $a \neq 1$: If $a^u = a^v$, then $u = v$.

SUMMARY Properties of Logarithms

In the list that follows, a, b, M, N, and r are real numbers. Also, $a > 0$, $a \neq 1$, $b > 0$, $b \neq 1$, $M > 0$, and $N > 0$.

Definition	$y = \log_a x$ means $x = a^y$	
Properties of logarithms	$\log_a 1 = 0$; $\log_a a = 1$	$\log_a M^r = r \log_a M$
	$a^{\log_a M} = M$; $\log_a a^r = r$	$a^x = e^{x \ln a}$
	$\log_a(MN) = \log_a M + \log_a N$	If $M = N$, then $\log_a M = \log_a N$.
	$\log_a\left(\frac{M}{N}\right) = \log_a M - \log_a N$	If $\log_a M = \log_a N$, then $M = N$.
Change-of-Base Formula	$\log_a M = \frac{\log_b M}{\log_b a}$	

The compound interest formula states that $F = P\left(1 + \frac{r}{n}\right)^{nt}$

The continuously compounded interest formula states that $F = Pe^{rt}$

The exponential law states that an amount A varies with time t according to the function $A(t) = A_0 e^{kt}$
As long as the start time is 0, the value of k can be determined using the adder a and either the multiplier m or the divider d:

$\boxed{k = \frac{\ln m}{a}}$ or $\boxed{k = \frac{\ln(1/d)}{a}}$