College Algebra Formulas Tests – Use This to Study

Positive	*Zero*	*Negative*
$\lvert 3x+5\rvert = 4$ *becomes* $3x+5=4$ *or* $3x+5=-4$ *(drop)* *(drop/sign flip)*	$\lvert 3x+5\rvert = 0$ *becomes* $3x+5=0$	$\lvert 3x+5\rvert = -4$ *has* No Solution

For inequalities involving absolute value:

…**positive**, rewrite as a compound or combined inequality without absolute value bars (see examples below)

$>$ *or* $\geq$	$\lvert 3x+5\rvert > 4$ *becomes* $3x+5>4$ *or* $3x+5<-4$ *(drop)* *(drop/double sign flip)*	$\lvert 3x+5\rvert \geq 7$ *becomes* $3x+5\geq 7$ *or* $3x+5\leq -7$ *(drop)* *(drop/double sign flip)*
$<$ *or* $\leq$	$\lvert 3x+5\rvert < 9$ *becomes the combined inequality* $-9<3x+5<9$	$\lvert 3x+5\rvert \leq 2$ *becomes the combined inequality* $-2\leq 3x+5\leq 2$

…**zero**, rewrite as an equality or inequality, or state the solution as "All Real Numbers" or "No Solution" (see examples below)

$>$ *or* $\geq$	$\lvert 3x+5\rvert > 0$ *becomes the inequality* $3x+5\neq 0$	$\lvert 3x+5\rvert \geq 0$ *has the solution* All Real Numbers
$<$ *or* $\leq$	$\lvert 3x+5\rvert < 0$ *has* No Solution	$\lvert 3x+5\rvert \leq 0$ *becomes the equality* $3x+5=0$

…**negative**, state the solution as "All Real Numbers" or "No Solution" (see examples below)

$>$ *or* $\geq$	$\lvert 3x+5\rvert > -4$ *has the solution* All Real Numbers	$\lvert 3x+5\rvert \geq -7$ *has the solution* All Real Numbers
$<$ *or* $\leq$	$\lvert 3x+5\rvert < -9$ *has* No Solution	$\lvert 3x+5\rvert \leq -2$ *has* No Solution

Some equation forms of a line:

<u>Slope-Intercept Form</u>

$y = mx + b$

<u>Point-Slope Form</u>

$y - y_1 = m(x - x_1)$

<u>Standard/General Form</u>

$Ax + By = C$

Some equation forms of a circle:

<u>Standard Form</u>

$(x-h)^2 + (y-k)^2 = r^2$

<u>General Form</u>

$x^2 + y^2 + ax + by + c = 0$

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

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

Some equation forms of a parabola:

<u>Vertex Form</u>

$\boxed{y = a(x-h)^2 + k}$

<u>Standard Form</u>

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

The Law of Exponents:

Given $a > 0$ with $a \neq 1$: If $\boxed{a^u = a^v}$ then $\boxed{u = v}$

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 → $\boxed{y = \log_a x}$ means $\boxed{x = a^y}$

Properties of logarithms

$\log_a 1 = \boxed{0}$ $\quad \log_a a = \boxed{1}$ $\quad \log_a M^r = \boxed{r \log_a M}$

$a^{\log_a M} = \boxed{M}$ $\quad \log_a a^r = \boxed{r}$ $\quad \boxed{a^x} = e^{x \ln a}$

$\boxed{\log_a(MN)} = \log_a M + \log_a N$ $\quad$ If $M = N$, then $\log_a M = \boxed{\log_a N.}$

$\log_a\left(\frac{M}{N}\right) = \boxed{\log_a M - \log_a N}$ $\quad$ If $\log_a M = \log_a N$, then $M = \boxed{N}$

Change-of-Base Formula → $\boxed{\log_a M = \frac{\log_b M}{\log_b a}}$

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

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

The exponential law states that an amount A varies with time t according to the function $\boxed{A(t) = A_0 e^{kt}}$
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 $\boxed{k = \frac{\ln(1/d)}{a}}$