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Mathematics Department

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Difference of Squares

$A^2 - B^2 = (A + B)(A - B)$

Sum of Cubes

$A^3 + B^3 = (A + B)(A^2 - AB + B^2)$

Difference of Cubes

$A^3 - B^3 = (A - B)(A^2 + AB + B^2)$

Slope

$$m = \frac{y_1 - y_2}{x_1 - x_2}$$

Slope Intercept

$y = mx + b$

Point Slope

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

Two Point

$$y - y_1 = \frac{y_1 - y_2}{x_1 - x_2}(x - x_1)$$

Distance

$$d = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

$$\text{mid} = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$

Domain

$f(x) = \sqrt{Ax + B} \quad set\ Ax + B \geq 0$

Quadratic Formula

$ax^2 + bx + c = 0$

$a = \_\_\_ \quad b = \_\_\_ \quad c = \_\_\_$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$i^2 = -1 \quad \sqrt{-1} = i$

$a \neq 0 \quad a^0 = 1 \quad \frac{0}{a} = 0$

$\frac{a}{0} = undefined \quad \frac{0}{0} = indeterminate$

Absolute Value

$|x| = a \quad x = -a \quad or \quad x = a$

$|x| < a \quad -a < x < a$

$|x| > a \quad x < -a \quad or \quad x > a$

Vertex

$$\begin{matrix} Min \\ Max \end{matrix} = \left(-\frac{b}{2a}, f\left(-\frac{b}{2a}\right)\right)$$

Average Rate of Change

$x = A \ to \ x = B$

$$\frac{f(B) - f(A)}{B - A}$$

Compounded Continuous

(Population) $A = Pe^{rt}$

Compounded Monthly/Daily

$$A = P\left(1 + \frac{r}{N}\right)^{Nt}$$

Half Life

$$A = P\left(\frac{1}{2}\right)^{\frac{t}{N}}$$

Composites

$(f - g)(x) = f(x) - g(x)$

$(f + g)(x) = f(x) + g(x)$

$(fg) = f(x) * g(x)$

$$\left(\frac{f}{g}\right)(x) = \frac{f(x)}{g(x)}$$

$(f \circ g)(x) = f(g(x))$

$(g \circ f)(x) = g(f(x))$

Difference Quotient

$\frac{f(x+h) - f(x)}{h}$

Rules of ln/log

$\ln(A) + \ln(B) = \ln(AB)$

$$\ln(A) - \ln(B) = \ln\left(\frac{A}{B}\right)$$

$\ln(A^N) = N \ln(A)$

$\ln(e) = 1$

$\ln(1) = 0$

$\ln(A) = \ln(B) \ \ then\ A = B$

Change of Base

$$\log_b(A) = \frac{\ln(A)}{\ln(b)}$$

$\log_b(b) = 1$

$\log_b(y) = x \quad then \quad b^x = y$

$A^x = A^y \quad then \quad x = y$

If $\log_b(Ax + B) = \log_b(Cx + D)$

then $(Ax + B) = (Cx + D)$

Same base power rule

If $b^{Ax+B} = b^{Cx+D}$

then $Ax + B = Cx + D$

If $\log_b(Ax + B) = C$

then $b^C = Ax + B$

Domain

$f(x) = \log(Ax + B)$

$set\ Ax + B > 0$

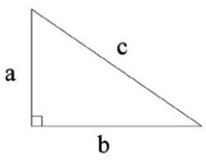
Circle Formula

$(x - a)^2 + (y - b)^2 = r^2;$

Center(a, b); Radius $= r$

Pythagorean Theorem

$a^2 + b^2 = c^2$



Amortization

$$A = P\frac{\left(\frac{r}{n}\right)}{\left(1 - \left(1 + \frac{r}{n}\right)^{(-nt)}\right)}$$

Summation

$$\sum_{x=a}^{b}(Ax + B) \rightarrow \text{Calculator: } sum\left(seq(Ax + B, x, a, b, 1)\right)$$

$$(A + B)^N = {}_NC_0(A)^N(B)^0 + {}_NC_1(A)^{N-1}(B)^1 + \cdots + {}_NC_N(A)^0(B)^N$$