Formulas to Remember:

$$a^n a^m = a^{m+n}$$

$$\frac{a^m}{a^n} = a^{m-n}$$

$$(a)^{mn} = a^{m+n}$$

$$a^{-m} = \frac{1}{a^m}$$

$$a^0 = 1$$

$$\sqrt{ab} = \sqrt{a}\sqrt{b}$$

$$\frac{\sqrt{a}}{\sqrt{b}} = \sqrt{\frac{a}{b}}$$

$$\sqrt{a+b} \neq \sqrt{a} + \sqrt{b}$$

$$\sqrt[m]{x^n} = x^{\frac{n}{m}}$$

$$a^2 - b^2 = (a+b)(a-b)$$

$$a^3 - b^3 = (a-b)(a^2 + ab + b^2)$$

$$a^3 + b^3 = (a+b)(a^2 - ab + b^2)$$

$$(a+b) = a^2 + 2ab + b^2$$

$$\sqrt{-1} = i$$

$$i^2 = -1$$

$$a \pm bi$$

$$ax^2 + bx + c = 0$$

$$a(x-h)^2 + k = 0$$

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

$$x = \frac{-b}{2a}$$

$$ax + by = c$$

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

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

$$y = mx + b$$

$$m_1 = m_2 \text{ parallel}$$

$$\mathrm{m}_1 m_2 = -1 \, perpendicular$$

$$y = kx$$

$$y = \frac{k}{x}$$

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

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

$$3^x = 9 \longrightarrow \log_3 9 = x$$

$$\log_2 3 = \frac{\log 3}{\log 2}$$

$$\log_e = \ln$$

$$\log xy = \log x + \log y$$

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

$$\log \frac{x}{y} = \log x - \log y$$

$$A = Pe^{nt}$$

$$\log x^y = y \log x$$

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

$$\frac{(x-h)^2}{a^2}+\frac{(y-k)^2}{b^2}=1$$

$$b^2=a^2-c^2$$

$$\frac{(x-h)^2}{a^2}-\frac{(y-k)^2}{b^2}=1$$

$$\frac{(y-k)^2}{b^2}-\frac{(x-h)^2}{a^2}=1$$

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

$$y=\pm\frac{a}{b}x, \quad y=\pm\frac{b}{a}x$$

$$x^2=4py$$

$$y^2=4px$$

$$(x-h)^2=4p(y-k)$$

$$(y-k)^2=4p(x-h)$$

$$x=\frac{Dx}{D},\ y=\frac{Dy}{D},\ z=\frac{Dz}{z}\qquad \begin{vmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{vmatrix}=0 \text{ collinearity}$$

$$\pm\frac{1}{2}\begin{vmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{vmatrix}=A \qquad \begin{vmatrix} x & y & 1 \\ x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \end{vmatrix}=0$$

$$a_n = a_1 + (n - 1)d$$

$$S = n\left(\frac{a_1 + a_2}{2}\right)$$

$$a_n = a_1 r^{n-1}$$

$$S_n = \frac{a(1 - r^n)}{1 - r}$$

$$S_\infty = \frac{a_1}{1 - n}$$

$$ {}_nP_n = \frac{n!}{(n-r)!} $$

$$ 0! = 1 $$

$$ 1! = 1 $$

$$ \frac{{}_nP_n}{p!q!r!} = \frac{n!}{p!q!r!} $$

$$ {}_nC_r = \frac{{}_nP_r}{r!} $$

$$ (a+b)^n = \sum_{r=0}^{n} \frac{n!}{r!(n-r)!} d^{n-1} b^r $$

$$ {}_nP_r = \frac{n!}{(n-r)!} $$