

**Pre-Calculus Semester 2 Final Formulas**

**Trig Identities**

$$\begin{aligned} \cos 2\theta &= 2\cos^2 \theta - 1 & \sin 2\theta &= 2\sin \theta \cos \theta \\ &= 1 - 2\sin^2 \theta \\ &= \cos^2 \theta - \sin^2 \theta & \cos^2 \theta + \sin^2 \theta &= 1 \end{aligned}$$

**Series**

$$\sum_{n=1}^{\infty} a(r)^{n-1} = \frac{a}{1-r} \qquad \sum_{i=1}^n a(r)^{i-1} = \frac{a(1-r^n)}{1-r}$$

$$\sum_{i=1}^n a + d(i-1) = \frac{n}{2}(a_1 + a_n)$$

**Laws of Sines & Cosines**

$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c} \qquad a^2 = b^2 + c^2 - 2bc \cos A$$

**Polar Equations/ Vectors/ Parametric Equations**

$$\begin{aligned} x &= r \cos \theta \\ y &= r \sin \theta \\ x^2 + y^2 &= r^2 \end{aligned}$$

**Conic Sections**

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

$$\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1 \qquad c^2 = \text{big}^2 - \text{small}^2$$

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

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