

**HONORS ALGEBRA 3-4**  
**2<sup>nd</sup> Semester Final Exam Formulas**

**Sum and Difference Formulas**

$$\sin(u+v) = \sin u \cos v + \cos u \sin v$$

$$\sin(u-v) = \sin u \cos v - \cos u \sin v$$

$$\cos(u+v) = \cos u \cos v - \sin u \sin v$$

$$\cos(u-v) = \cos u \cos v + \sin u \sin v$$

$$\tan(u+v) = \frac{\tan u + \tan v}{1 - \tan u \tan v}$$

$$\tan(u-v) = \frac{\tan u - \tan v}{1 + \tan u \tan v}$$

**Area of a Triangle**

$$\text{Area} = \frac{1}{2}bc \sin A = \frac{1}{2}ab \sin C = \frac{1}{2}ac \sin B$$

$$\text{Area} = \sqrt{s(s-a)(s-b)(s-c)}$$

$$s = \frac{(a+b+c)}{2}$$

**Arithmetic Sequences**

$$a_n = a_1 + d(n-1) \quad \text{-OR-} \quad a_n = dn + a_0$$

$$S_n = \frac{n}{2}(a_1 + a_n)$$

**Geometric Sequences**

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

$$S_n = a_1 \left( \frac{1-r^n}{1-r} \right) \quad (\text{Finite sum})$$

$$S = \frac{a_1}{1-r} \quad (\text{Infinite sum, } |r| < 1)$$

**DeMoivre's Theorem**

$$z^n = [r(\cos \theta + i \sin \theta)]^n$$

$$z^n = r^n (\cos n\theta + i \sin n\theta)$$

**Law of Sines**

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

**Law of Cosines**

$$a^2 = b^2 + c^2 - 2bc \cos A$$

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

**Remember: Check your mode when doing trig problems!! Good luck & have a great summer!!**