

Final Exam Reference

Rounding: Round final answers to the place requested. Remember not to round numbers in the middle of a problem -- it leads to inaccuracy! Use the "store" feature of your calculator to store intermediate values in a letter on your calculator or use "2nd Ans".

<u>sine</u> $\sin(\theta) = \frac{\text{opp}}{\text{hyp}}$	<u>cosecant</u> $\csc(\theta) = \frac{1}{\sin(\theta)}$
<u>cosine</u> $\cos(\theta) = \frac{\text{adj}}{\text{hyp}}$	<u>secant</u> $\sec(\theta) = \frac{1}{\cos(\theta)}$
<u>tangent</u> $\tan(\theta) = \frac{\sin(\theta)}{\cos(\theta)} = \frac{\text{opp}}{\text{adj}}$	<u>cotangent</u> $\cot(\theta) = \frac{1}{\tan(\theta)} = \frac{\cos(\theta)}{\sin(\theta)}$

Law of Sines:

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

Laws of Cosines:

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

$$b^2 = a^2 + c^2 - 2ac \cos B \qquad \cos B = \frac{a^2 + c^2 - b^2}{2ac}$$

$$c^2 = a^2 + b^2 - 2ab \cos C \qquad \cos C = \frac{a^2 + b^2 - c^2}{2ab}$$

Pythagorean Identities:

$$\sin^2 x + \cos^2 x = 1$$

$$1 + \tan^2 x = \sec^2 x$$

$$1 + \cot^2 x = \csc^2 x$$

Sum and Difference Formulas:

$$\sin(\alpha + \beta) = \sin \alpha \cos \beta + \cos \alpha \sin \beta$$

$$\sin(\alpha - \beta) = \sin \alpha \cos \beta - \cos \alpha \sin \beta$$

$$\cos(\alpha + \beta) = \cos \alpha \cos \beta - \sin \alpha \sin \beta$$

$$\cos(\alpha - \beta) = \cos \alpha \cos \beta + \sin \alpha \sin \beta$$

$$\tan(\alpha + \beta) = \frac{\tan \alpha + \tan \beta}{1 - \tan \alpha \tan \beta}$$

$$\tan(\alpha - \beta) = \frac{\tan \alpha - \tan \beta}{1 + \tan \alpha \tan \beta}$$

Double Angle Formulas:

$$\sin(2x) = 2 \sin x \cos x$$

$$\cos(2x) = \cos^2 x - \sin^2 x = 1 - 2 \sin^2 x = 2 \cos^2 x - 1$$

$$\tan(2x) = \frac{2 \tan x}{1 - \tan^2 x}$$

Half Angle Formulas:

$$\sin\left(\frac{x}{2}\right) = \pm \sqrt{\frac{1 - \cos x}{2}}$$

$$\cos\left(\frac{x}{2}\right) = \pm \sqrt{\frac{1 + \cos x}{2}}$$

$$\tan\left(\frac{x}{2}\right) = \frac{1 - \cos x}{\sin x} = \frac{\sin x}{1 + \cos x}$$