

Exam I - Formula Sheet

$$\sin^2 x = \frac{1 - \cos(2x)}{2}.$$

$$\cos^2 x = \frac{1 + \cos(2x)}{2}.$$

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

Trig substitutions:

$$\sqrt{a^2 - x^2}:$$

$$x = a \sin t, \quad -\pi/2 \leq t \leq \pi/2.$$

$$\sqrt{a^2 + x^2}:$$

$$x = a \tan t, \quad -\pi/2 < t < \pi/2.$$

$$\sqrt{x^2 - a^2}:$$

$$x = a \sec t, \quad 0 \leq t \leq \pi, \quad t \neq \pi/2.$$

A few integral formulas:

$$\int \frac{1}{\sqrt{a^2 - x^2}} dx = \sin^{-1} \left(\frac{x}{a} \right) + C.$$

$$\int \frac{1}{a^2 + x^2} dx = \frac{1}{a} \tan^{-1} \left(\frac{x}{a} \right) + C.$$

$$\int u dv = uv - \int v du.$$