

Recitation Handout 2(a): Trigonometric Integrals**1. Helpful Trigonometric Formulas****Identities**

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

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

Double Angle Formulas

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

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

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

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

Angle Addition Formulas

$$\sin(a + b) = \sin(a)\cos(b) + \cos(a)\sin(b)$$

$$\cos(a + b) = \cos(a)\cos(b) - \sin(a)\sin(b)$$

$$\sin(a - b) = \sin(a)\cos(b) - \cos(a)\sin(b)$$

$$\cos(a - b) = \cos(a)\cos(b) + \sin(a)\sin(b)$$

2. Integration Formulas Involving Trigonometric Functions**Basic Formulas**

$$\int \sin(x) dx = -\cos(x) + C$$

$$\int \cos(x) dx = \sin(x) + C$$

Reversing Trigonometric Derivative Rules

$$\int \sec^2(x) dx = \tan(x) + C$$

$$\int \csc^2(x) dx = -\cot(x) + C$$

$$\int \sec(x)\tan(x) dx = \sec(x) + C$$

$$\int \csc(x)\cot(x) dx = -\csc(x) + C$$

Formulas Obtained via Substitution, Integration by Parts, etc.

$$\int \tan(x) dx = \ln\left|\sec(x)\right| + C$$

$$\int \sec(x) dx = \ln\left|\sec(x) + \tan(x)\right| + C$$