

Math 21B

Kouba

Differentiation Rules from Math 21A and Trig Identities

$$1.) D(c) = 0$$

$$2.) D(mx + b) = m$$

$$3.) D(x^n) = nx^{n-1}$$

$$4.) D(f(x) \pm g(x)) = f'(x) \pm g'(x)$$

$$5.) D(cf(x)) = cf'(x)$$

$$6.) D(f(x)g(x)) = f(x)g'(x) + f'(x)g(x)$$

$$7.) D\left(\frac{f(x)}{g(x)}\right) = \frac{g(x)f'(x) - f(x)g'(x)}{(g(x))^2}$$

$$8.) D(e^x) = e^x$$

$$9.) D(a^x) = a^x \ln a$$

$$10.) D(\ln x) = \frac{1}{x}$$

$$11.) D(\log_b x) = \frac{1}{x} \log_b e$$

$$12.) D(\sin x) = \cos x$$

$$13.) D(\cos x) = -\sin x$$

$$14.) D(\tan x) = \sec^2 x$$

$$15.) D(\cot x) = -\csc^2 x$$

$$16.) D(\sec x) = \sec x \tan x$$

$$17.) D(\csc x) = -\csc x \cot x$$

$$18.) D(\arctan x) = \frac{1}{1+x^2}$$

$$19.) D(\arcsin x) = \frac{1}{\sqrt{1-x^2}}$$

$$20.) D(\text{arcsec } x) = \frac{1}{|x|\sqrt{x^2-1}}$$

Trig Identities

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

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

$$3.) \cos 2x = 2 \cos^2 x - 1 \dots \text{so that} \dots \cos^2 x = (1/2)(1 + \cos 2x) \\ = 1 - 2 \sin^2 x \dots \text{so that} \dots \sin^2 x = (1/2)(1 - \cos 2x) \\ = \cos^2 x - \sin^2 x$$

$$4.) 1 + \tan^2 x = \sec^2 x$$

$$5.) 1 + \cot^2 x = \csc^2 x$$