

Week 13 — Exam Review

MATH:113, Recitations 304 and 305

DERIVATIVES

Names: _____

Write down the limit definition of the derivative. What does each term represent?

Write down the general forms of:

(a) *The power rule.*

For a function $f(x)$ and $f^n(x) = (f(x))^n$,

$$\frac{d}{dx}(f(x))^n = n \cdot (f(x))^{n-1} \cdot \frac{d}{dx}f(x).$$

(b) *The product rule.*

(e) *The derivatives of $\sin(t)$, $\cos(t)$, and $\tan(t)$.*

(f) *The derivatives of the inverses of the functions in (e).*

(c) *The quotient rule.*

(g) *The derivative of $\ln(x)$.*

(d) *The chain rule.*

(h) *The derivative of the exponential function $e^{u(x)}$.*

Find solutions to the following.

$$\frac{d}{dx} \frac{6x^2}{2-x}$$

$$\frac{d}{dt} \tan(t) \sec(t)$$

$$\frac{d}{dx} e^{1-\cos(x)}$$

$$\lim_{x \rightarrow \infty} x \ln \left(1 + \frac{3}{x} \right)$$

$$\lim_{x \rightarrow 0} \frac{\sin(10x)}{x}$$

$$\frac{d}{dx} \sin^{-1}(x+4)$$

$$\frac{d}{dt} \csc(7t)$$

$$\frac{d}{dt} \cos(x^2 e^{2x})$$