Notes: Power Rule and Graphs of Functions and Their Derivatives Derivatives (1) Day 3

$\frac{d}{dx}$ → Means take a derivative with respect to x.

$f'(x)$ → Means take a derivative of $f(x)$.

$\frac{d}{dt}$ → Means take a derivative with respect to t.

y' → Means take a derivative.

Algebra you should know:

$$m^{\frac{a}{b}} = \sqrt[b]{m^a} = \left(\sqrt[b]{m}\right)^a$$

$$m^{-a} = \frac{1}{m^a} \quad \text{and} \quad \frac{1}{m^a} = m^{-a}$$

Rules of Exponents

$m^{\frac{a}{b}} =$

$m^{-a} =$

Power Rule: For all exponents n

- $\frac{d}{dx}\left[x^n\right] =$ _____
- $\frac{d}{dx}\left[\text{Constant}\right] =$ _____

Multiply by the exponent and drop the degree by one.

Power Rule

$\frac{d}{dx}\left[x^n\right] =$

Example(s) One:

A. $3x^2 =$ _____

B. $4x^3 =$ _____

C. $5x =$ _____

D. $2x^4 =$ _____

E. $x^{\frac{5}{2}} =$ _____

F. $3x^{\frac{1}{2}} =$ _____

G. $2x^4\Big|_{x=-2} =$ _____

$\frac{d}{dx}\left[Cons\tan t\right] =$

$\frac{d}{dx}\left[e^x\right] =$

$\frac{d}{dx}\left[e^{AT}\right] =$

$AT = anything$

H. $x^{\frac{5}{2}}\Big|_{x=4} =$ _____

What is the sum and constant multiple rule of differentiable Functions.

Linearity Rules: Assume that f and g are differentiable functions.

- Sum Rule: $(f+g)' =$
- Constant Multiple Rule: $(cf)' =$

Example(s) Two: A. $3x^2+4x-8=$_____

B. $5x^3-4x^2+3x+5-e^x=$_____

Example Three: $f(m) = \sqrt[4]{m} + \sqrt[5]{m} + \sqrt[6]{m^7}$ find: $f'(m)$

Example Four: $f(x) = \frac{1}{x^{\frac{2}{3}}}$ find $f'(x)$

Example Five: $f(x) = (3x+4)^2$ find $f'(x)$

Example Six: $f(x) = \sqrt{x}(x^2+2x+3)$ find $f'(x)$

Example Seven: $g(t)=\frac{t^4+6t^3-9t^2+5t}{t}$ Find $g'(t)$

Example Eight: $y=\frac{x^4+3x^3-2x^2+5}{x^{\frac{1}{2}}}$ Find y'

Example Nine: Given $f(x)=e^x+3$ find the equation of the tangent line at x=0.

Example Ten: Given $f(x)=3x^2+4x-8$ find the equation of the tangent line at x=2.