

Unit: Differentiation Rules

Date: _____

Topic: Differentiation Rules Review

Objective: SWBAT repair the skills needed to find the derivative using the power, product, quotient, trigonometric, and chain rules.

NO CALCULATOR ALLOWED

PART 1: FINDING THE DERIVATIVE: Find the derivative for each of the following functions using the appropriate rule(s). Show ALL work.

1) $y = 4x^7 - \frac{3}{x^5} + 6$	2) $y = (x^5 - 1)(3x^2 + 4)$
3) $y = x^2 \cos x - 5 \sec x$	4) $y = \frac{-8}{(3x + 2)^2}$
5) $y = (6x^3 + 9)^4$	6) $y = 2x^{1/4} - 5x^{3/2} - 6x$

7) $y = \left(x^2 + \frac{3}{x}\right)^2$	8) $y = \frac{3\cot x}{5x}$
9) $y = 2x^3\sqrt{4x-1}$	10) $y = -3\sqrt{x} - 2\sin x$
11) $y = -\frac{1}{2} \sqrt[4]{(2x^5 - x)^3}$	12) $y = 4\tan^5(2x)$

PART 2: USING THE DERIVATIVE: Read each question carefully and show ALL work.

13) Find the instantaneous rate of change of the curve $h(x) = \frac{5x^{2/3} - 10x^{3/4}}{2\sqrt{x}}$ when $x = 1$.

- 14) Find the equation of the tangent line to the curve $y = -2\sqrt{3x}$ when $x = 12$.
- 15) Find the equation of the line perpendicular to the tangent line to the curve $y = \frac{3x}{2x^3 + 1}$ at $(-1, 3)$.
- 16) Find the value of $f'(-2)$ if $f(x) = (2x^3 + 6x + 1)^{2/3}$.
- 17) Find $f'(3)$ given that $f(x) = ab$, $a(3) = 6$, $b'(3) = -5$, $b(3) = -9$, and $a'(3) = 1$.

- 18) Find the equation(s) of the tangent line(s) to the curve $y = \frac{1}{6}x^3 - 4x$ at the point(s) where the slope is -2.
- 19) Determine the points, if any, at which $m(x) = -\frac{1}{2}(3x - 2)^4 - 5$ has a horizontal tangent line.
- 20) Find the value of $f''(-3)$ if $f(x) = \frac{x^4}{12} - 8x$.