

Week - In - Review Oct. 1 : Derivative Rules

1. Find the derivative for the following functions and simplify:

(a) $f(x) = 5x^2(x^3 + 2)$

(b) $f(x) = x^3 h(x)$

(c) $f(x) = (5 - x^2)(x^3 + 2x^2)$

(d) $f(x) = \frac{h(x)}{x^2}$

(e) $f(x) = \frac{6\sqrt[3]{x}}{x^2 - 3}$

8. Find the equation of the line tangent to the graph of $f(x) = (7 - 3x)(x + 2x^2)$ at $x = 2$.

9. Find the value(s) of x where $f(x) = \frac{x}{x^2 + 1}$ has horizontal tangent lines.

10. Find the derivative of the following functions and simplify:

(a) $f(x) = \frac{\tan x}{1 + \cos x}$

$$(b) f(x) = x^2 \sqrt{2x^3 + 1}$$

$$(c) f(x) = \frac{(x + 5)^5}{(1 - 3x)^4}$$

(d) $f(x) = \sec^2(4x^4 - 5)$

(e) $f(x) = (x^2 + 1)^4 (6 - 2x)^3$

(f) $f(x) = e^{x \tan x}$

(g) $f(x) = \log_5(7 - 4x) + 3^{\sec(2x)}$

(h) $f(x) = 7^{x^2} \log(x^4 + 1)$

(i) $f(x) = \ln \sqrt{\frac{x^2 + 5}{5x - 8}}$

11. Find the equation of the tangent line to $f(x) = \sec x - 2 \cos x$ at $x = \frac{\pi}{3}$.