

Assignment 2-2

1. Use the Product Rule to differentiate. Simplify your answer. $f(x) = (x^2 - 2)(4x + 3)$
2. Differentiate without using the Product Rule. $f(x) = (x^2 - 2)(4x + 3)$
3. Use the Quotient Rule to differentiate. $f(x) = \frac{2x+1}{x^2+2}$
4. Differentiate without using the Quotient or Product Rules. $f(x) = \frac{x^2-4}{x+2}$
5. Differentiate without using the Quotient or Product Rules. $g(x) = \frac{2}{5x^2}$

Differentiate by any method you wish.

6. $y = \frac{12x^2 - 4}{4}$
7. $f(t) = \frac{1}{t^2}(t^3 - t^2)$
8. $g(x) = 2(x^2 + 5x - 3)$
9. $f(x) = \frac{2x-3}{3x-2}$
10. $y = x^2 \sin x$
11. $y = \sqrt{x}(x+1)$
12. $f(x) = \frac{x^2 - c}{x^2 + c}$, c is a constant

Differentiate by any method you wish.

13. $f(x) = \frac{\cos x}{x^3}$
14. $g(x) = \frac{2x-4}{2\sqrt{x}}$
15. $y = \frac{2(1-\sin x)}{3\cos x}$

Find the indicated derivative value. Simplify.

16. $g(x) = x \cos x$ find $g'\left(\frac{\pi}{4}\right)$
17. $f(x) = x^2 + 5x - \tan x$ find $f'(0)$
18. $f(x) = \frac{x^2 - 9}{x - 2}$ find $f'(1)$
19. $h(t) = \frac{\sec t}{t^2}$ find $h'(\pi)$
20. Find the second derivative of $y = \frac{4x^3}{3}$.
21. Find an equation of the tangent line to the graph of $f(x) = \frac{x}{x+1}$ at the point $(-2, 2)$.
22. Find the x -coordinate(s) of point(s) at which the graph of $g(x) = (2x-1)(x^2+3)$ has a tangent line parallel to the graph of $y = 6x + 1$.
23. Find the x -coordinate(s) of point(s) at which the graph of $f(x) = \frac{x^2}{x+1}$ has a horizontal tangent line.
24. Find the average rate of change of $f(x) = \frac{x}{\sin x}$ on the interval $\left[\frac{\pi}{6}, \frac{\pi}{2}\right]$.
25. Find the rate of change of $f(x) = \frac{x}{\sin x}$ when $x = \frac{\pi}{6}$.
26. Given $g(x) = x \cdot f(x)$. If $f(2) = 3$ and $f'(2) = -2$, find $g'(2)$.
27. If $h(x) = \frac{f(x)}{x^2}$, $f(2) = 3$, and $f'(2) = -2$, find $h'(2)$.
28. If $f(x) = \frac{g(x)}{h(x)}$, $g(3) = 2$, $g'(3) = 3$, $h(3) = 4$, and $h'(3) = 5$, find $f'(3)$.