

MATH 171 - Derivative Worksheet

Differentiate these for fun, or practice, whichever you need. The given answers are not simplified.

1. $f(x) = 4x^5 - 5x^4$
2. $f(x) = e^x \sin x$
3. $f(x) = (x^4 + 3x)^{-1}$
4. $f(x) = 3x^2(x^3 + 1)^7$
5. $f(x) = \cos^4 x - 2x^2$
6. $f(x) = \frac{x}{1 + x^2}$
7. $f(x) = \frac{x^2 - 1}{x}$
8. $f(x) = (3x^2)(x^{\frac{1}{2}})$
9. $f(x) = \ln(xe^{7x})$
10. $f(x) = \frac{2x^4 + 3x^2 - 1}{x^2}$
11. $f(x) = (x^3)^{\sqrt[5]{2-x}}$
12. $f(x) = 2x - \frac{4}{\sqrt{x}}$
13. $f(x) = \frac{4(3x-1)^2}{x^2 + 7^x}$
14. $f(x) = \sqrt{x^2 + 8}$
15. $f(x) = \frac{x}{\sqrt{1 - (\ln x)^2}}$
16. $f(x) = \frac{6}{(3x^2 - \pi)^4}$
17. $f(x) = \frac{(3x^2 - \pi x)^4}{6}$
18. $f(x) = \frac{x}{(x^2 + \sqrt{3x})^5}$
19. $f(x) = (xe^x)^\pi$
20. $f(x) = [\arctan(2x)]^{10}$
21. $f(x) = (e^{2x} + e)^{\frac{1}{2}}$
22. $f(x) = (x^6 + 1)^5(4x + 7)^3$
23. $f(x) = (7x + \sqrt{x^2 + 3})^6$
24. $f(x) = \frac{\frac{1}{x} + \frac{1}{x^2}}{x - 1}$
25. $f(x) = \sqrt[3]{x^2} - \frac{1}{\sqrt{x^3}}$
26. $f(x) = \sqrt{\frac{2x+5}{7x-9}}$
27. $f(x) = \frac{\sin x}{\cos x}$
28. $f(x) = e^x(x^2 + 3)(x^3 + 4)$
29. $f(x) = \frac{5x^2 - 7x}{x^2 + 2}$
30. $f(x) = [\ln(5x^2 + 9)]^3$
31. $f(x) = \ln(5x^2 + 9)^3$
32. $f(x) = \cot(6x)$
33. $f(x) = \sec^2 x \cdot \tan x$
34. $f(x) = \arcsin(2^x)$
35. $f(x) = \tan(\cos x)$
36. $f(x) = [(x^2 - 1)^5 - x]^3$
37. $f(x) = \sec x \cdot \sin(3x)$
38. $f(x) = \frac{(x-1)^3}{x(x+3)^4}$
39. $f(x) = \log_5(3x^2 + 4x)$

In problems 40 – 42, find $\frac{dy}{dx}$. Assume y is a differentiable function of x .

40. $3y = xe^{5y}$
41. $xy + y^2 + x^3 = 7$
42. $\frac{\sin y}{y^2 + 1} = 3x$

If f and g are differentiable functions such that $f(2) = 3$, $f'(2) = -1$, $f'(3) = 7$, $g(2) = -5$ and $g'(2) = 2$, find the numbers indicated in problems 43 – 48.

43. $(g - f)'(2)$
44. $(fg)'(2)$
45. $\left(\frac{f}{g}\right)'(2)$
46. $(5f + 3g)'(2)$
47. $(f \circ f)'(2)$
48. $\left(\frac{f}{f+g}\right)'(2)$