

SECTION 3.4 PRACTICE PROBLEMS

Complete #1-16, 19, 25, 29. You must show ALL work on a separate sheet of paper.

In Exercises 1–18, find $f'(x)$.

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| 1. $f(x) = 2 \cos x - 3 \sin x$ | 2. $f(x) = \sin x \cos x$ |
| 3. $f(x) = \frac{\sin x}{x}$ | 4. $f(x) = x^2 \cos x$ |
| 5. $f(x) = x^3 \sin x - 5 \cos x$ | 6. $f(x) = \frac{\cos x}{x \sin x}$ |
| 7. $f(x) = \sec x - \sqrt{2} \tan x$ | 8. $f(x) = (x^2 + 1) \sec x$ |
| 9. $f(x) = \sec x \tan x$ | 10. $f(x) = \frac{\sec x}{1 + \tan x}$ |
| 11. $f(x) = \csc x \cot x$ | |
| 12. $f(x) = x - 4 \csc x + 2 \cot x$ | |
| 13. $f(x) = \frac{\cot x}{1 + \csc x}$ | 14. $f(x) = \frac{\csc x}{\tan x}$ |
| 15. $f(x) = \sin^2 x + \cos^2 x$ | 16. $f(x) = \frac{1}{\cot x}$ |
| 17. $f(x) = \frac{\sin x \sec x}{1 + x \tan x}$ | |
| 18. $f(x) = \frac{(x^2 + 1) \cot x}{3 - \cos x \csc x}$ | |

In Exercises 19–24, find d^2y/dx^2 .

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| 19. $y = x \cos x$ | 20. $y = \csc x$ |
| 21. $y = x \sin x - 3 \cos x$ | 22. $y = x^2 \cos x + 4 \sin x$ |
| 23. $y = \sin x \cos x$ | 24. $y = \tan x$ |
25. Find the equation of the line tangent to the graph of $\tan x$ at
 (a) $x = 0$ (b) $x = \pi/4$ (c) $x = -\pi/4$.
26. Find the equation of the line tangent to the graph of $\sin x$ at
 (a) $x = 0$ (b) $x = \pi$ (c) $x = \pi/4$.
29. Find all values in the interval $[-2\pi, 2\pi]$ at which the graph of f has a horizontal tangent line.
 (a) $f(x) = \sin x$ (b) $f(x) = x + \cos x$
 (c) $f(x) = \tan x$ (d) $f(x) = \sec x$