

Calculus Review Practice Sets for Derivatives

Directions: Simplify answers completely unless you see DNS (do not simplify). Evaluate trig functions completely. Do not leave negative exponents in your answers. No calculators. No notes.

Practice Set A Problems	Practice Set B Problems	Practice Set C Problems
1. $\frac{d}{dx}\left(\frac{1}{4x} - e^2x^3 + \sqrt[3]{x^5}\right)$	1. $y = \sec(\pi t - 1)$, find $\frac{dy}{dt}$.	1. $f(t) = \tan(e^{t^2})$, find $f'(t)$.
2. $y = 4x^3 \ln 2x$, find $\frac{dy}{dx}$.	2. $\frac{d}{dx}(2^x \tan x)$	2. $f(x) = 2 \cos x \csc x$, find $f'(x)$.
3. $f(x) = \frac{3x+1}{x^2-4}$, find $f'(x)$.	3. $y = \frac{5}{x^2} - \sqrt{x^3} + \pi^2$, find y' .	3. $y = 5 \sin^3 t$, find $\frac{dy}{dt}$.
4. $y = e^{\sin 2t}$, find $\frac{dy}{dt}$.	4. $f(x) = \frac{5 \ln x}{x^2 + 4x}$, find $f'(x)$.	4. $\frac{d}{dx}\left(\frac{x^2 - 3x}{x^2 + 1}\right)$
5. $s = \sqrt{3t^2 - 1}$, find $\frac{ds}{dt}$.	5. $\frac{d}{d\theta}(e^{3\theta} \sec 2\theta)$	5. $A = \frac{2}{\sqrt{x}} - \frac{4x^9}{3} + x \ln 2$, find $\frac{dA}{dx}$.
6. $\frac{d}{dx}\left(\frac{\sqrt{2x+3}}{\sin x}\right)$ DNS	6. $V = 5e^{x^2-2}$, find $\frac{dV}{dx}$	6. $y = 6\sqrt[3]{x^2 - 4x + 1}$, find $\frac{dy}{dx}$.
7. $f(x) = \cos^2 x$, find $f''(x)$.	7. $v(t) = 5t^3 - 8t^2 + \frac{4}{t}$, find $\frac{dv}{dt}\Big _{t=-1}$.	7. $y = \frac{\sin^2 \pi x}{\pi x}$, find y' . DNS
8. $s(t) = 3^t - 2$, find $\frac{ds}{dt}\Big _{t=2}$.	8. $y = (2x \cot 3x)^2$, find y' . DNS	8. $\frac{d}{dx}(3x^2 \cdot 5^x)$
9. $y = \frac{4 \sin 2x}{x^2 + 1}$, find y' .	9. $f(x) = \sec x$, find $f''(x)$.	9. $h(x) = \sin 2x$, find $h''\left(\frac{\pi}{8}\right)$.
10. $f(x) = \ln(\sec x)$, find $f'(\pi/4)$.	10. $g(x) = -\cos 2x$, find $g''\left(\frac{\pi}{6}\right)$.	10. $a(t) = 2t^4 - 4 \ln t + 5$, find $\frac{da}{dt}\Big _{t=2}$.

Calculus Review Practice Sets for Derivatives – Answer Key

Practice Set A – Answers	Practice Set B - Answers	Practice Set C - Answers
1. $-\frac{1}{4x^2} - 3e^2x^2 + \frac{5}{3}x^{2/3}$	1. $\frac{dy}{dt} = \pi \sec(\pi t - 1) \tan(\pi t - 1)$	1. $f'(t) = 2te^{t^2} \sec^2(e^{t^2})$
2. $\frac{dy}{dx} = 4x^2 + 12x^2 \ln 2x$	2. $2^x \sec^2 x + (\ln 2) 2^x \tan x$	2. $f'(x) = -2 \cot^2 x - 2$ or $-2 \csc^2 x$
3. $y' = \frac{-3x^2 - 2x - 12}{(x^2 - 4)^2}$	3. $y' = -\frac{10}{x^3} - \frac{3}{2}x^{1/2}$	3. $\frac{dy}{dt} = 15 \sin^2 t \cos t$
4. $\frac{dy}{dt} = 2e^{\sin 2t} \cos 2t$	4. $f'(x) = \frac{5(x + 4 - 2x \ln x - 4 \ln x)}{(x^2 + 4x)^2}$	4. $\frac{3x^2 + 2x - 3}{(x^2 + 1)^2}$
5. $\frac{ds}{dt} = \frac{3t}{(3t^2 - 1)^{1/2}}$	5. $e^{3\theta} \sec 2\theta (2 \tan 2\theta + 3)$	5. $\frac{dA}{dx} = -\frac{1}{x^{3/2}} - 12x^8 + \ln 2$
6. $\frac{\sin x \cdot \frac{1}{2}(2x + 3)^{-1/2} \cdot 2 - (2x + 3)^{1/2} \cos x}{\sin^2 x}$	6. $\frac{dV}{dx} = 10xe^{x^2-2}$	6. $\frac{dy}{dx} = \frac{(4x - 8)}{(x^2 - 4x + 1)^{2/3}}$
7. $f''(x) = -2 \cos^2 x + 2 \sin^2 x$	7. $\left. \frac{dv}{dt} \right _{t=-1} = 27$	7. $y' = \frac{2\pi^2 x \sin \pi x \cos \pi x - \pi \sin^2 \pi x}{(\pi x)^2}$
8. $\left. \frac{ds}{dt} \right _{t=2} = 9 \ln 3$ or $\ln 3^9$	8. $y' = 2(2x \cot 3x) \cdot [(2x)(-\csc^2 3x \cdot 3) + (\cot 3x)(2)]$	8. $5^x (3x^2 \ln 5 + 6x)$
9. $y' = \frac{8(x^2 \cos 2x + \cos 2x - x \sin 2x)}{(x^2 + 1)^2}$	9. $\frac{d^2 f}{dx^2} = \sec^3 x + \tan^2 x \sec x$	9. $h''\left(\frac{\pi}{8}\right) = -2\sqrt{2}$
10. $f'(\pi/4) = 1$	10. $g''\left(\frac{\pi}{6}\right) = 2$	10. $\left. \frac{da}{dt} \right _{t=2} = 62$