

AP CALCULUS DERIVATIVE REVIEW

1. $16x(4x^2+1) \quad (4x^2+1)^2$
 $2(4x^2+1)(8x)$
2. $54x^2+12+15x^{-2} \quad 18x^3+12x-15x^{-1}$
3. $3x^8+\frac{5x^2}{2} \quad \frac{x^9}{3}+\frac{5x^3}{6}-\frac{9}{2}$
4. $\frac{1}{2}x^{-\frac{1}{2}}-3x^{-4} \quad \sqrt{x}+\frac{1}{x^3}$
5. $\frac{1}{2}x^{-\frac{1}{2}}+\frac{1}{3}x^{-\frac{2}{3}}+\frac{2}{3}x^{-\frac{1}{3}} \quad \sqrt{x}+\sqrt[3]{x}+\sqrt[3]{x^2}$
6. $0 \quad \pi^2$
7. $\frac{4}{3}x^{\frac{1}{3}}+\frac{6}{5}x^{\frac{1}{5}} \quad x(\sqrt[3]{x}+\sqrt[5]{x})$
 $x^{\frac{4}{3}}+x^{\frac{6}{5}}$
8. $\frac{4x^2+16x-1}{(x+2)^2} \quad \frac{4x^2+1}{x+2}$
 $\frac{(x+2)(8x)-(4x^2+1)(1)}{(x+2)^2}$
 $\frac{8x^2+16x-4x^2-1}{(x+2)^2}$
 $\frac{4x^2+16x-1}{8x^4}$
9. $2x^3+\frac{7}{16}x^{-\frac{9}{2}} \quad \frac{4x^8-\sqrt{x}}{8x^4}$
 $\frac{1}{2}x^4-\frac{1}{8}x^{-\frac{7}{2}}$
10. $2 \sin x \cos x \quad \sin^2 x$
 $\sin 2x$
11. $-2x \sin(x^2) \quad \cos(x^2)$
 $-\sin(x^2)(2x)$
12. $2 \sin 3x \cos 4x$
 $2(\sin(3x)(-\sin 4x)(4) + \cos(4x) \cos(3x)(3))$
 $-8 \sin 3x \sin 4x + 6 \cos 3x \cos 4x$
13. $\sec x \tan 2x$
 $\sec x (\sec^2(2x)(2)) + \tan(2x) \tan x \sec x$
 $\sec x (2 \sec^2(2x) + \tan x \tan(2x))$
14. $\sin(\cos(x^3))$
 $\cos(\cos(x^3))(-\sin(x^3))(3x^2)$
 $-3x^2 \sin(x^3) \cos(\cos(x^3))$
15. $0 \quad \cos(\frac{\pi}{3})$
16. $\frac{3x^2}{3y^2+1} \quad x^3-y^3=y$
 $3x^2-3y^2 \frac{dy}{dx} = \frac{dy}{dx}$
 $3x^2 = (3y^2+1) \frac{dy}{dx}$
17. $\frac{8y-x}{y-8x} \quad x^2-16xy+y^2=1$
 $2x-16(x \frac{dy}{dx} + y(1)) + 2y \frac{dy}{dx} = 0$
 $x-8x \frac{dy}{dx} - 8y + y \frac{dy}{dx} = 0$
 $\frac{dy}{dx}(-8x+y) = 8y-x$
18. $\frac{-x^{-\frac{1}{2}}}{y^{-\frac{1}{2}}-8y} \quad x^{\frac{1}{2}}+y^{\frac{1}{2}}=2y^2$
 $\frac{1}{2}x^{-\frac{1}{2}}+\frac{1}{2}y^{-\frac{1}{2}} \frac{dy}{dx} = 4y \frac{dy}{dx}$
 $\frac{dy}{dx}(y^{-\frac{1}{2}}-8y) = -x^{-\frac{1}{2}}$
19. $-4 \cos(2x) \quad \cos(2x)$
 $-\sin(2x)(2)$
 $-2 \sin(2x)$
 $-2 \cos(2x)(2)$
20. $\frac{\sin x \sin^2 y - \cos^2 x \cos y}{\sin^3 y} \quad \sin x + 1 = \cos y$
 $\cos x = -\sin y \frac{dy}{dx}$
 $\frac{\cos x}{-\sin y} = \frac{dy}{dx}$
 $\frac{(-\sin y)(-\sin x) - (\cos x)(-\cos y)}{(-\sin y)^2} \frac{dy}{dx}$
 $\frac{\sin x \sin y + \cos x \cos y}{\sin^2 y} \frac{dy}{dx}$