

$$1. \frac{d}{dx} [(1+x)^{15}] = 15(x+1)^{14}$$

$$3. \frac{d}{dx} [(3-2x)^5] = 5(3-2x)^4(-2)$$

$$5. \frac{d}{dx} [(x^3-2x^2+3x+1)^{11}] = 11(x^3-2x^2+3x+1)^{10}(3x^2-4x+3)$$

$$7. \frac{d}{dx} [(x+3)^{-5}] = \frac{-5}{(x+3)^6}$$

$$9. \frac{d}{dx} [\sin(x^2+x)] = \cos(x^2+x)(2x+1)$$

$$11. D_x [\cos^3 x] = -3\cos^2 x \sin x$$

$$13. D_x \left[\left(\frac{x+1}{x-1} \right)^3 \right] = 3 \left(\frac{x+1}{x-1} \right)^2 \cdot \left(\frac{-2}{(x-1)^2} \right)$$

$$15. D_x \left[\cos \left(\frac{3x^2}{x+2} \right) \right] = -\sin \left(\frac{3x^2}{x+2} \right) \cdot \left[\frac{(x+2)(6x) - 3x^2(1)}{(x+2)^2} \right]$$

$$17. D_x [(3x-2)^2(3-x^2)^2] = 2(3x-2)(3)(3-x^2)^2 + (3x-2)^2 \cdot (2)(3-x^2)(-2x)$$

$$19. D_x \left[\frac{(x+1)^2}{3x-4} \right] = \frac{(3x-4)2(x+1) - (x+1)^2(3)}{(3x-4)^2}$$

$$21. y' = 2(x^2+4)(2x)$$

$$23. D_t \left(\left[\frac{3t-2}{t+5} \right]^3 \right) = 3 \left(\frac{3t-2}{t+5} \right)^2 \cdot \frac{(t+5)(3) - (3t-2)}{(t+5)^2}$$

$$25. \frac{d}{dt} \left[\frac{(3t-2)^3}{t+5} \right] = \frac{(t+5)(3)(3t-2)^2(3) - (3t-2)^3}{(t+5)^2}$$

$$27. \frac{dy}{dx} = 3 \left(\frac{\sin x}{\cos 2x} \right)^2 \frac{\cos(2x)\cos(x) + \sin(x)\sin(2x)(2)}{(\cos 2x)^2}$$

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$$29. f'(x) = 3 \left(\frac{x^2+1}{x+2} \right)^2 \cdot \frac{(x+2)(2x) - (x^2+1)}{(x+2)^2}$$

$$f'(3) = 3 \left(\frac{10}{5} \right)^2 \left(\frac{5 \cdot 6 - 10}{25} \right) = \frac{3 \cdot 4 \cdot 20}{25} = \frac{48}{5}$$

$$31. F'(t) = \cos(t^2 + 3t + 1)(2t + 3)$$

$$F'(1) = 5 \cos(5)$$

$$33. D_x [\sin^4(x^2 + 3x)] = 4 \sin^3(x^2 + 3x)(2x + 3)$$

$$35. D_t [\sin^3(\cos t)] = 3 \sin^2(\cos t) \cdot (\cos(\cos t))(-\sin t)$$

$$37. D_\theta [\cos^4(\sin(\theta^2))] = 4 \cos^3(\sin(\theta^2))(-\sin(\sin(\theta^2))) \cos(\theta^2) \cdot (2\theta)$$

$$39. \frac{d}{dx} [\sin(\cos(\sin(2x)))] = \cos[\cos(\sin(2x))](-\sin[\sin(2x)]) \cdot \cos(2x) \cdot 2$$

$$41. (f+g)'(4) = f'(4) + g'(4) \approx 0 + 1 = 1$$

$$43. (fg)'(2) = f'(2)g(2) + f(2)g'(2) \approx 1 \cdot 1 + 3 \cdot 0 = 1$$

$$45. (f \circ g)'(6) = f'(g(6)) \cdot g'(6) \approx f'(2) \cdot g'(6) \approx 1 \cdot -1 = -1$$

$$47. D_x (F(2x)) = 2F'(2x)$$

$$49. D_t ((F(t))^{-2}) = \frac{-2}{(F(t))^3} \cdot F'(t)$$

$$51. \frac{d}{dz} [(1 + F(2z))^2] = 2(1 + F(2z)) \cdot F'(2z) \cdot (2)$$

$$53. \frac{d}{dx} (F(\cos x)) = F'(\cos x) \cdot (-\sin x)$$

$$55. D_x (\tan(F(2x))) = \sec^2(F(2x)) \cdot F'(2x) \cdot 2$$

$$57. D_x (F(x) \cdot \sin^2(F(x))) = F'(x) \cdot \sin^2(F(x)) + F(x) \cdot 2 \sin(F(x)) \cdot \cos(F(x)) \cdot F'(x)$$

$$59. g'(x) = -\sin(f(x)) \cdot f'(x) \Rightarrow g'(0) = -\sin(1) \cdot 2 \quad \boxed{= -2 \sin 1}$$