

$$1 = y = (2x^3 - 6x^2) - (7x + 11)$$

$$y' = \frac{d}{dx} (2x^3 - 6x^2)$$

$$y' = \frac{d}{dx} (2x^3) - \frac{d}{dx} (6x^2)$$

$$y = 3(2)x^{3-1} - 2(6)x^{2-1}$$

$$y' = 6x^2 - 12x$$

$$y' = \frac{d}{dx} (7x + 11)$$

$$y' = \frac{d}{dx} (7x) + \frac{d}{dx} (11)$$

$$y' = 7$$

$$2 = 11/4 x^3 + 7/3 x^2$$

$$\frac{v dv - u du}{v^2}$$

$$\frac{11}{4} x^{3-1} = \frac{33}{4} x^2$$

$$\frac{7}{3} x^2 = \frac{14}{3} x$$

$$y' = \frac{33}{4} x^2 + \frac{14}{3} x$$

$$3 = y = 11 \cdot 2x^2 - 6x^3 = -4x - 18x^2$$

$$4. y = \frac{x}{(x^2 - 8x)}$$

$$\frac{v \, du - u \, dv}{v^2}$$

$$u = x$$

$$v = x^2 - 8x$$

$$du = 1$$

$$dv = 2x - 8$$

$$y' = \frac{x^2 - 8x(1) - x(2x - 8)}{(x^2 - 8x)^2}$$

$$5. y = \frac{5}{(3x - 4)}$$

$$v \, du - u \, dv$$

$$u = 5$$

$$v = 3x - 4$$

$$-3x - 4(0) - 5(3x)$$

$$du = 0$$

$$dv = 3x$$

$$y' = \frac{15}{(3x - 4)^2}$$

$$6. y = \frac{(3x + 2)}{(2x - 1)}$$

$$\frac{v \, du - u \, dv}{v^2}$$

$$u = 3x + 2$$

$$v = 2x - 1$$

$$du = 3x$$

$$dv = 2x$$

$$y' = \frac{2x - 1(3x) - (3x + 2)(2x)}{(2x - 1)^2}$$

$$y' = \frac{6x^2 - 3x - 6x^2 - 4x}{(2x - 1)^2}$$

$$7. y = \frac{(3x^2 + 1)}{(2x)}$$

$$\frac{v \, du - u \, dv}{v^2}$$

$$u = 3x^2 + 1$$

$$v = 2x$$

$$du = 6x$$

$$dv = 2$$

$$= \frac{2x^2 - 6x \cdot 2}{(2x)^2}$$

$$y' = \frac{2x(6x) - (3x^2 + 1)(2)}{(2x)^2}$$

$$y' = \frac{12x^2 - 6x \cdot 2 - 2}{(2x)^2}$$

$$= \frac{6x^2 - 6x - 1}{2x^2} \quad 1 - y = 8$$

$$8: y = \frac{5}{(4+x^2)}$$

$$u = 5 \quad v = 4+x^2$$

$$du = 0 \quad dv = 2x$$

$$y' = 4x \cdot \frac{d}{dx} \left(\frac{5}{(4+x^2)} \right) = -5(2x)$$

$$y' = \frac{-10x}{(4+x^2)^2}$$

$$9: y = (1+2x)^2$$

$$y' = \frac{d}{dx} (1+2x)^2$$

$$y' = 2(1+2x)^{2-1} \cdot 2$$

$$y' = 2(1+2x) \cdot (2) = \frac{d}{dx} (1+2x)^2$$

$$10: y = \frac{3}{5}x^2 - \frac{3}{4}x + \frac{1}{8} \rightarrow 0$$

$$\frac{6}{5}x - \frac{3}{4}$$

$$11: \frac{2x^2}{\tan x^2} \quad u = 2x^2 \quad v = \tan x^2$$

$$du = 4x \quad dv = 2x \sec^2 x^2$$

$$y' = \frac{4x \cdot \tan x^2 - 4x^3 \sec^2 x^2}{(\tan x^2)^2}$$

$$y' = \frac{4x(\tan x^2 - x^2 \sec^2 x^2)}{(\tan x^2)^2}$$

$$(\tan x^2)^2$$

$$12. 3x^2 \cos 3x^2$$

$$u = 3x^2$$

$$du = 6x$$

$$-18x^3 \sin 3x^2 + 6x \cos 3x^2$$

$$y = 6x (-3x^2 \sin 3x^2 + \cos 3x^2)$$

$$13. \sin x^2 \cos x^2$$

$$u = \sin x^2$$

$$du = \cos x^2$$

$$v = \cos x^2$$

$$dv = -2x \sin x^2$$

$$\sin x^2 (2 - \sin x^2) + \cos x^2 (-2x \sin x^2)$$

$$-2x (\sin x^2)^2 + 2x \cos x^2$$

$$y' = -2x (\sin x^2)^2 + 2x \cos x^2$$

$$14. \cot 3x^3$$

$$u = 3x^3$$

$$dx$$

$$\frac{d(\cot u)}{dx} = -\csc^2 u \cdot \frac{du}{dx}$$

$$du = 9x^2$$

$$y' = -9x^2 (\csc^2 3x^3)$$

$$15. \sqrt{2x^3 \cos x^2}$$

$$y' = (2x^3 \cos x^2)^{1/2}$$

$$y = \frac{1}{2} (2x^3 \cos x^2)^{-1/2}$$

$$du = 2x^3$$

$$(2x^3) (\cos x^2 \sin x^2) \cdot 5 \cdot 1$$

$$dv = \cos x^2$$

$$(5x^2) (\cos x^2)$$

$$4x^4 \cos x^2 \sin x^2 + 6x^2 \cos x^2$$

$$y = \frac{1}{2} (2x^3 \cos x^2)^{-1/2} \cdot 4x^4 \cos x^2 \sin x^2 + 6x^2 \cos x^2$$

$$y' = 4x^4 \cos x^2 \sin x^2 + 6x^2 \cos x^2$$

$$\frac{2}{2x^3 \cos x^2}$$

$$16 = \sqrt{2x^3} \sec 2x$$

$$u^n = n u^{n-1} \cdot \frac{du}{dx}$$

$$y = (2x^3 \sec 2x)^{1/2}$$

$$y' = \frac{1}{2} (2x^3 \sec 2x)^{-1/2}$$

$$du = 2x^3$$

$$du = \sec 2x$$

$$(2x^3)(\sec 2x \tan 2x)$$

$$(6x^2)(\sec 2x)$$

$$4x^4 \sec 2x \tan 2x$$

$$y' = \frac{1}{2} (2x^3 \sec 2x)^{-1/2} \cdot 4x^4 \sec 2x \tan 2x$$

$$x^2 \cdot \frac{4x^4 \sec 2x \tan 2x}{2 \sqrt{2x^3 \sec 2x}}$$

$$y' = 4x^4 \sec 2x \tan 2x \sqrt{2x^3 \sec 2x}$$

$$17 = 2x^3 / 5x^3$$

$$u = 2x^3$$

$$du = 6x^2$$

$$v = \sqrt{5x^3} = (5x^3)^{1/2} \rightarrow n u^n \frac{du}{dx}$$

$$dv = \frac{3}{2} (5x^3)^{-1/2} \cdot 15x^2$$

$$dv = \frac{15x^2}{2} \cdot (5x^3)^{-1/2} = \frac{15x^2}{2\sqrt{5x^3}}$$

$$y' = \frac{30x^5}{2\sqrt{5x^3}}$$

$$y' = \frac{15x^5}{\sqrt{5x^3}}$$

$$18 = -4 \sec 2x^4$$

$$u = 2x^4$$

$$du = 8x^3$$

$$\frac{d}{dx} (\sec u) = \sec u \cdot \tan u \cdot \frac{du}{dx}$$

$$-4 (\sec 2x^4) \cdot \tan 2x^4 \cdot (8x^3)$$

$$= -32x^3 \sec 2x^4 \cdot \tan 2x^4$$

$$19. y = (\cos 2x \cdot 3)^3$$

$$u = \cos 2x \cdot 3$$

$$du = -\sin 2x \cdot 2 \cdot (6x^2)$$

$$du = -6x^2 \sin 2x \cdot 3$$

$$n-1 = 3-1$$

$$n-1 = 2$$

$$n = 3$$

$$20. y = \frac{-1}{(\sec x^2)^2}$$

$$y = (\sec x^2)^{-2}$$

$$n = -2$$

$$n-1 = -3$$

$$u = \sec x^2$$

$$du = 2x \cos x^2$$

$$y' = -2(\sec x^2)^{-3} \cdot (2x \cos x^2)$$

$$y' = (\sec x^2)^{-3} \cdot (4x \cos x^2)$$

$$y' = \frac{-4x \cos x^2}{(\sec x^2)^3}$$