

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

$$y' = 6x^2 - 12x - 7$$

$$2. y = \frac{11}{4}x^3 + \frac{7}{3}x^2$$

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

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

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

$$du = 1 \quad dv = 2x - 8$$

$$u^2 = (x^2 - 8x)$$

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

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

$$u = 5 \quad v = 3x - 4 \quad y' = \frac{(3x - 4)(0) - 5(3)}{(3x - 4)^2}$$

$$du = 0 \quad dv = 3$$

$$6. y = (3x + 2)(2x + 1)$$

$$u = 3x + 2 \quad v = 2x + 1$$

$$du = 3 \quad dv = 2$$

$$y' = (2x + 1)^2$$

$$(2x + 1)^2 = -2$$

$$y' = 3(2x + 1)^2(2x + 1)$$

$$2(2x + 1)^2$$

$$(2x + 1)^2 - (x - 3)$$

$$(2x + 4)$$

$$(2x - 1)^2 = 6x - 3 - 6x - 4$$

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

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

$$y' = \frac{2^2 - 6x^2 + 2}{4x^2} = \frac{2 - 6x^2 + 2}{4x^2} = \frac{4 - 6x^2}{4x^2}$$

$$v = (3x^2 + 1) \quad v = 2x$$

$$dv = 6x$$

$$dv = 2$$

$$y' = \frac{3}{2} - \frac{1}{2} \cdot 2$$

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

$$y' = (5)(2x) + (4+x^2)$$

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

$$v = 5 \quad v = (4+x^2)$$

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

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

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

$$y' = 2(1+2x) - (2)$$

$$y' = 4(1+2x)$$

$$v = 1+2x$$

$$n = 2$$

$$n-1 = 1$$

$$dv = 2$$

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

$$\frac{3}{5} \frac{d}{dx} (x^2) - \frac{3}{4} \frac{d}{dx} (x) + \frac{d}{dx} \left(\frac{1}{8}\right)$$

$$\frac{3}{5} \cdot 2x - \frac{3}{4} (1)$$

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

$$11: y = \frac{z+z}{\tan x^z}$$

$$v^z = (\tan x^z)^z$$

$$y' = 4x \tan x^z \cdot 9x^3 \sec^z x^z$$

$$u = z+z$$

$$v = \tan x^z$$

$$(\tan x^z)^z$$

$$du = 4x$$

$$dv = z \times \sec^z x^z$$

$$y' = 4x (\tan x^z)^z \times z \times \sec^z x^z$$

$$(\tan x^z)^z \sec^z x^z$$

$$12: y = 3x^z \cos 3x^z$$

$$u = 3x^z$$

$$v = \cos 3x^z$$

$$du = 3x$$

$$dv = -6x \sin 3x^z$$

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

$$y' = 18x^3 \sin 3x^z + 6x \cos 3x^z$$

$$13: y = \sin x^z \cdot \cos x^z$$

$$u = \sin x^z$$

$$v = \cos x^z$$

$$du = z \cos x^z$$

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

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

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

$$14: y = \cos 3x^3$$

$$y' = (\sec 3x^3) \frac{d}{dx} (3x^3)$$

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

$$15: y = \sqrt{2x^3} \cos x^z = \sqrt{2x^3} \sqrt{\cos x^z}$$

$$u = \sqrt{2x^3} \quad v = \sqrt{\cos x^z}$$

$$u = \sqrt{2x^3} \quad v = (\cos x^z)^{\frac{1}{2}}$$

$$u = 2x^{\frac{3}{2}} \quad du = \frac{3}{2} (2x^{\frac{1}{2}})$$

$$3\sqrt{x} \sqrt{\cos x^z} \quad du = 3x^{\frac{1}{2}}$$

$$y' = \sqrt{2x^3} \times \sin x^z \quad du = 3\sqrt{x} \quad du = + \sec$$

$$3\sqrt{\cos x^z}$$

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

$$u = \sqrt{2 \sec 2x}$$

$$v = (\sec 2x)^{\frac{1}{2}}$$

$$dv = \frac{1}{2} (\sec 2x)^{-\frac{1}{2}} \cdot 2 \sec$$

$$dv = \sec 2x \tan 2x = \sqrt{\sec 2x} + 3 \sqrt{x \sec 2x}$$

$$17: y = 2x^2 \sqrt{5x+3}$$

$$u = 2x^2 \quad dv = \sqrt{5x+3}$$

$$du = 4x \quad dv = \frac{1}{2} (5x+3)^{-\frac{1}{2}} = \frac{1}{2} \frac{5}{\sqrt{5x+3}}$$

$$y' = 2x^2 \left(\frac{15x+7}{2\sqrt{5x+3}} \right) + 4x^2 (\sqrt{5x+3})$$

$$y' = \frac{15x^3 + 7x^2}{\sqrt{5x+3}} + 6x^2 \sqrt{5x+3}$$

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

$$18: y = 4 \sec 2x^4$$

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

$$y' = 4 (8x^3) \sec 2x^4 \tan 2x^4$$

$$y' = 32x^3 \sec 2x^4 \tan 2x^4$$

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

$$u = \cos 2x^2$$

$$n = 3$$

$$n-1 = 2$$

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

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

$$y' = 12x^2 (\cos 2x^3)^2 \sin 2x^3$$

$$20: y = \left(\frac{1}{\sin x} \right)^2$$

$$n = -2$$

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

$$n-1 = -3$$

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

$$u = \sin x^2$$

$$y' = 4x \cos x^2 (\sin x^2)^3$$