

$$y' = 18x^5$$

$$y' = 24x^5 + 9x^2 - 6$$

$$y' = -12x^{-5} + x^{-1/2}$$

$$y' = \frac{-12}{x^5} + \frac{1}{\sqrt{x}}$$

$$4) y = x^{3/2} + 5x^{-1}$$

$$y' = \frac{3}{2}x^{1/2} - 5x^{-2}$$

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

$$5) y = 3\sqrt{x} + x^{-2}$$

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

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

$$6) y = (2 - x - 3x^3)(7 + x^5)$$

$$y' = (2 - x - 3x^3)(5x^4) - (7 + x^5)(-1 - 9x^2)$$

$$y' = \cancel{10x^4} - \cancel{5x^5} - \cancel{15x^7} + \cancel{7} + \cancel{x^5} + \cancel{63x^2} + \cancel{9x^7}$$

$$y' = -6x^7 - 4x^5 + 10x^4 + 63x^2 + 7$$

$$7) y = (x^3 + 7x^2 - 8)(2x^{-3} + x)$$

$$y = 2 + 14x^{-1} - 16x^{-3} + x^{-1} + 7x^{-2}$$

$$y' = -14x^{-2} + 48x^{-4} - x^{-2} - 14x^{-3} + 3$$

$$y' = \frac{-14}{x^2} + \frac{48}{x^4} - \frac{1}{x^2} - \frac{14}{x^3} + \frac{32}{x^5}$$

$$8) y = (x^{-1} + x^{-2})(3x^3 + 27)$$

$$y = 3x^2 + 27x^{-1} + 3x + 27x^{-2}$$

$$y' = 6x - 27x^{-2} + 3 - 54x^{-3}$$

$$y' = 6x + 3 - \frac{27}{x^2} - \frac{54}{x^3}$$

$$9) y = (3x^2 + 1)^2$$

$$y = 9x^4 + 6x^2 + 1$$

$$y' = 36x^3 + 12x$$

$$10) y = \frac{5x-3}{x}$$

$$y' = \frac{x(5) - (5x-3)(1)}{x^2}$$

$$y' = \frac{5x - 5x + 3}{x^2} = \frac{3}{x^2}$$

$$11) y = \frac{x^2+1}{3x}$$

$$y' = \frac{3x(2x) - (x^2+1)(3)}{9x^2}$$

$$y' = \frac{6x^2 - 3x^2 - 3}{9x^2}$$

$$y' = \frac{3x^2 - 3}{9x^2} = \frac{3(x^2-1)}{9x^2} = \frac{x^2-1}{3x^2}$$

$$12) y = \frac{2x-1}{x+3}$$

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

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

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

$$y = (2x^7 - x^2) \left( \frac{x-1}{x+1} \right)$$

$$y = \frac{2x^8 - 2x^7 - x^3 + x^2}{x+1}$$

$$y' = \frac{(x+1)(16x^7 - 14x^6 - 3x^2 + 2x) - (2x^8 - 2x^7 - x^3 + x^2)(1)}{(x+1)^2}$$

$$y' = \frac{\cancel{16x^8} - \cancel{14x^7} - \cancel{3x^3} + 2x^2 + \cancel{16x^7} - \cancel{14x^6} - \cancel{3x^2} + 2x - \cancel{2x^8} + \cancel{2x^7} + \cancel{x^3} - \cancel{x^2}}{(x+1)^2}$$

$$y' = \frac{14x^8 + 4x^7 - 14x^6 - 2x^3 - 2x^2 + 2x}{(x+1)^2}$$

$$14) y = 3x^6 + 2x - 1$$

$$y' = 18x^5 + 2$$

$$y' = \frac{(5x-3)(0) - 1(5)}{(5x-3)^2}$$

$$y' = \frac{-5}{(5x-3)^2}$$

$$y' = \frac{6(3x^2) - (x^3-2)(0)}{36}$$

$$y' = \frac{18x^2}{36} = \frac{x^2}{2}$$

$$17) y = (3x^2+6)(2x-1)$$

$$y = 6x^3 - 3x^2 + 12x - 6$$

$$y' = 18x^2 - 6x + 12$$

$$18) y = \frac{3x}{2x+1}$$

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

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

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

$$19) y = \frac{1}{(2x+3)(x+1)}$$

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

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

$$y' = \frac{(2x^2+x-3)(0) - 1(4x+1)}{(2x^2+x-3)^2}$$

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

$$20) y = \frac{4x+1}{x^2-5}$$

$$y' = \frac{(x^2-5)(4) - (4x+1)(2x)}{(x^2-5)^2}$$

$$y' = \frac{4x^2-20-8x^2-2x}{(x^2-5)^2}$$

$$y' = \frac{-4x^2-2x-20}{(x^2-5)^2}$$

$$21) y = \frac{2x^3-1}{x-2}$$

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

$$y' = \frac{6x^3-12x^2-2x^3+1}{(x-2)^2}$$

$$y' = \frac{4x^3-12x^2+1}{(x-2)^2}$$

$$22) y = 5x^2 - 4x + 7$$

$$y' = 10x - 4$$

$$y'' = 10$$

$$y''' = 0$$

$$23) y = x^{-5} + x^5$$

$$y' = -5x^{-6} + 5x^4$$

$$y'' = 30x^{-7} + 20x^3$$

$$y''' = -210x^{-8} + 60x^2$$

$$24) y = 2x^4 + 3x^3 - 10x - 15$$

$$y' = 8x^3 + 9x^2 - 10$$

$$y'' = 24x^2 + 18x$$

$$25) y = \frac{2}{5}x^5 - (6x^2 + 3x - 9)$$

$$y' = 2x^4 - 12x + 3$$

$$y'' = 8x^3 - 12$$

$$y''' = 24x^2$$

$$y^4 = 48x$$

$$y^5 = 48$$

$$y' = 2x - 3$$

$$y'(1) = 2 - 3 = -1$$

$$-1 = y - 5 = -1(x+1)$$

$$y - 5 = -x + 1$$

$$y = -x + 6$$

$$27) y' = 3x^2 - 27 \quad x=3, y=-53$$

$$3x^2 - 27 = 0 \quad x=-3, y=55$$

$$3(x^2-9) = 0$$

$$x^2-9 = 0$$

$$x = \pm 3$$

$$28) y' = \frac{(x^2+9)(1) - x(2x)}{(x^2+9)^2}$$

$$y' = \frac{x^2+9-2x^2}{(x^2+9)^2}$$

$$y' = \frac{-x^2+9}{(x^2+9)^2} \quad x = \pm 3$$