

$$a. f(x) = \sqrt{30} \quad f'(x) = 0$$

$$b. g(x) = -4x^{10} \quad g'(x) = -40x^9$$

$$c. h(t) = \frac{1}{4}(t^4 + 8) = \frac{1}{4}t^4 + 2 \quad h'(t) = t^3$$

$$d. y = \sqrt[3]{x} = x^{\frac{1}{3}} \quad y' = \frac{1}{3}x^{-\frac{2}{3}}$$

$$e. g(u) = u\sqrt{2} + \sqrt{3}u = u\sqrt{2} + \sqrt{3}u^{\frac{1}{2}}$$

$$g'(u) = \sqrt{2} + \frac{\sqrt{3}}{2\sqrt{u}}$$

$$f. y = x^{-\frac{2}{5}} \quad y' = -\frac{2}{5}x^{-\frac{7}{5}}$$

$$g. f(x) = \frac{3x^2 + 5x}{x} = 3x + 5 \quad f'(x) = 3$$

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

$$i. f(x) = \frac{x^3 - 1}{\sqrt{x}} = x^{\frac{5}{2}} - x^{-\frac{1}{2}} \quad f'(x) = \frac{5}{2}x^{\frac{3}{2}} + \frac{1}{2}x^{-\frac{3}{2}}$$

$$j. f(t) = t^{\frac{1}{3}}(t^2 + t + t^{-1}) = t^{\frac{7}{3}} + t^{\frac{4}{3}} + t^{-\frac{2}{3}}$$

$$f'(t) = \frac{7}{3}t^{\frac{4}{3}} + \frac{4}{3}t^{\frac{1}{3}} - \frac{2}{3}t^{-\frac{5}{3}}$$

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

$$= \frac{3x-1-3x-21}{(3x-1)^2} = \frac{-22}{(3x-1)^2}$$

$$l. v(x) = (2x^3 + 3)(x^4 - 2x) = 2x^7 - 4x^4 + 3x^4 - 6x = 2x^7 - x^4 - 6x$$

$$v'(x) = 14x^6 - 4x^3 - 6$$

$$m. u(x) = (x^{-2} + x^{-3})(x^5 - 2x^4) = x^3 - 2x^2 + x^2 - 2x = x^3 - x^2 - 2x$$

$$u'(x) = 3x^2 - 2x - 2$$

$$n. y = \frac{3\sqrt{x} - 1}{\sqrt{x} + 1} \quad y' = \frac{(\sqrt{x} + 1)\left(\frac{3}{2\sqrt{x}}\right) - (3\sqrt{x} - 1)\left(\frac{1}{2\sqrt{x}}\right)}{(\sqrt{x} + 1)^2}$$

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

$$o. g(t) = \frac{2t}{4 + t^2} \quad g'(t) = \frac{(4 + t^2)(2) - (2t)(2t)}{(4 + t^2)^2} = \frac{8 + 2t^2 - 4t^2}{(4 + t^2)^2}$$

$$= \frac{8 - 2t^2}{(4 + t^2)^2}$$

$$p. f(x) = \frac{3x^2 - 1}{x^2 + x + 1} \quad f'(x) = \frac{(x^2 + x + 1)(6x) - (3x^2 - 1)(2x + 1)}{(x^2 + x + 1)^2}$$

$$= \frac{6x^3 + 6x^2 + 6x - 6x^3 - 3x^2 + 2x + 1}{(x^2 + x + 1)^2} = \frac{3x^2 + 8x + 1}{(x^2 + x + 1)^2}$$

$$q. h(x) = \frac{1}{5x^2 - 3x} \quad h'(x) = -\frac{10x - 3}{(5x^2 - 3x)^2}$$

$$r. s(t) = \frac{1}{t^3 - t^2 - t + 1} \quad s'(t) = -\frac{3t^2 - 2t - 1}{(t^3 - t^2 - t + 1)^2}$$