

WARMUP

$$1) \frac{d}{dx} (x^2(\sqrt{x}+3))$$

$$\frac{d}{dx} (x^2(x^{\frac{1}{2}}+3))$$

$$\frac{d}{dx} (x^{5/2} + 3x^2)$$

$$\frac{5}{2}x^{3/2} + 6x$$

$$\frac{5}{2}\sqrt{x^3} + 6x$$

$$2) \frac{d}{dx} \left(\frac{3x^7 + 5x^3 - 2x}{x^2} \right)$$

$$\frac{d}{dx} \left(\frac{3x^7}{x^2} + \frac{5x^3}{x^2} - \frac{2x^1}{x^2} \right)$$

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

$$15x^4 + 5 + 2x^{-2}$$

$$15x^4 + 5 + \frac{2}{x^2}$$

$$b^n \cdot b^m = b^{n+m}$$

$$\frac{b^m}{b^n} = b^{m-n}$$

$$b^{-n} = \frac{1}{b^n}$$

$$f(x) = 5x^3 + 7x$$

$$f'(x) = 15x^2 + 7$$

$$18) f(x) = 5x^4 + \frac{1}{x^2} = 5x^4 + x^{-2}$$

$$f'(x) = 20x^3 - 2x^{-3}$$

$$f'(x) = 20x^3 - \frac{2}{x^3}$$

~~$$\frac{20x^3 - 2}{x^3}$$~~

p111-112 21, 23, 24, 26, 27, 29, 30, 31, 35

$$27) y = \frac{\theta - 1}{\sqrt{\theta}} = \frac{\theta^1}{\theta^{1/2}} - \frac{1}{\theta^{1/2}} = \theta^{1/2} - \theta^{-1/2}$$

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

$$y' = \frac{1}{2\theta^{1/2}} + \frac{1}{2\theta^{3/2}} = \frac{1}{2\sqrt{\theta}} + \frac{1}{2\sqrt{\theta^3}}$$

$$21) y = 3t^5 - 5\sqrt{t} + \frac{7}{t}$$

$$y = 3t^5 - 5t^{1/2} + 7t^{-1}$$

$$y' = 15t^4 - \frac{5}{2}t^{-1/2} - 7t^{-2}$$

$$y' = 15t^4 - \frac{5}{2t^{1/2}} - \frac{7}{t^2}$$

$$y' = 15t^4 - \frac{5}{2\sqrt{t}} - \frac{7}{t^2}$$

$$29) \frac{dV}{dr} \text{ if } V = \frac{4}{3} \pi r^2 b$$

$$V = \underbrace{\frac{4}{3} \pi b}_{\text{constant}} r^2$$

$$\frac{d}{dx} [c f(x)] = c f'(x)$$

$$\frac{dV}{dr} = \frac{4}{3} \pi b \cdot 2r = \frac{8}{3} \pi b r$$

$$24) y = \frac{x^2 + 1}{x} = \frac{x^2}{x} + \frac{1}{x} = \underline{x} + x^{-1}$$

$$\frac{d}{dx} [x^n] = n x^{n-1}$$

$$\frac{d}{dx} [x^{-1}] = -1 x^{-2}$$

$$\frac{dy}{dx} = \underline{1} - x^{-2} = 1 - \frac{1}{x^2}$$

$$31) y = ax^2 + bx + c$$

$$\frac{dy}{dx} = a \cdot 2x + b + 0 = 2ax + b$$

$$30) w = \underline{3ab^2} q$$

$$\frac{dw}{dq} = 3ab^2 \cdot 1 = 3ab^2$$

$$20) y = 6x^3 + 4x^2 - 2x$$

$$y' = 18x^2 + 8x - 2$$

$$26) f(t) = \frac{t^2 + t^3 - 1}{t^4}$$

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

$$f(t) = t^{-2} + t^{-1} - t^{-4}$$

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

$$\frac{a^m}{a^n} = a^{m-n}$$

$$\frac{1}{b^n} = b^{-n}$$

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