KERVIN CLYDE S. PADILLA 2DIFFCALC SEATWORK FEB 6 2024 20/20 +2

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

$$\boxed{\frac{dy}{dx} = 12x^2 - 6x + 2}$$

2) $y = (8x-5)^2 = (8x-5)(8x-5)$

$= 64x^2 - 40x - 40x + 25$

$$\boxed{\frac{dy}{dx} = 128x - 80}$$

3) $y = (1 + 2x^4)(3x^2 - x + 5)$ (u, v)

$\frac{du}{dy} = 8x^3$

$\frac{dv}{dy} = 6x - 1$

$\frac{d}{dx}(uv) = (1+2x^4)(6x-1) + (3x^2-x+5)(8x^3)$

$6x - 12x^5 + 24x^5 - 8x^4 + 40x^3$

~~$12x^5 + 24x^5 - 8x^4 + 40x^3 + 6x$~~

~~$\frac{d}{dx}(uv) = 36x^5 - 8x^4 + 40x^3 + 6x$~~

$6x + 12x^5 - 1 - 2x^4 + 24x^5 - 8x^4 + 40x^3$

$12x^5 + 24x^5 - 8x^4 - 2x^4 + 40x^3 + 6x - 1$

$$\boxed{\frac{dy}{dx} = 36x^5 - 10x^4 + 40x^3 + 6x - 1}$$

4) $y = \frac{3x^2 - x + 7}{2x+1}$ (u, v)

$\frac{du}{dy} = 6x - 1$

$\frac{dv}{dy} = 2$

$\frac{d}{dx}(u/v) = \frac{(2x+1)(6x-1) - (3x^2-x+7)(2)}{(2x+1)^2}$

$= \frac{(12x^2 + 6x - 2x - 1) - (6x^2 - 2x + 14)}{(2x+1)^2}$

$= \frac{12x^2 - 6x^2 + 6x + 2x - 2x - 14 - 1}{(2x+1)^2}$

$$\boxed{\frac{dy}{dx} = \frac{6x^2 + 6x - 15}{(2x+1)^2}}$$

5) $f(x) = \sqrt{x}\cos x$ (u, v)

$x^{1/2}\cos x$

$\frac{du}{dx} = \frac{1}{2}x^{-1/2} = \frac{1}{2\sqrt{x}}\left(\frac{\sqrt{x}}{\sqrt{x}}\right) = \frac{\sqrt{x}}{2x}$

$\frac{dv}{dx} = -\sin x$

$\frac{dy}{dx} = (\sqrt{x})(-\sin x) + (\cos x)\left(\frac{\sqrt{x}}{2x}\right)$

$\frac{dy}{dx} = -\sqrt{x}(\sin(x)) + \frac{\sqrt{x}(\cos(x))}{2x}$

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$$\boxed{\frac{dy}{dx} = -\sqrt{x}(\sin(x)) + \frac{\sqrt{x}(\cos(x))}{2x}}$$

or $-x^{1/2}(\sin(x)) + \frac{x^{1/2}(\cos(x))}{2x}$