

(1) $\Delta y = 0.6$

$$\begin{aligned}\Delta y &= f(x + \Delta x) - f(x) \\ &= 3(x + \Delta x) - (3x - 2) \\ &= 3\Delta x \\ &= 3(0.2) = 0.6\end{aligned}$$

(2) $dy = \frac{5}{2}(2x^4 + 1)^{3/2}(8x^3)dx$
(dx is an important component!)

(3) $\frac{dy}{dx} = \frac{4y^2 + \frac{7}{2}x^{5/2}}{3 - 8xy}$

$$\begin{aligned}4(x2y \frac{dy}{dx} + (1)y^2) + \frac{7}{2}x^{5/2} &= 3 \frac{dy}{dx} \\ 8xy \frac{dy}{dx} + 4y^2 + \frac{7}{2}x^{5/2} - 3 \frac{dy}{dx} &= 0 \\ (8xy - 3) \frac{dy}{dx} &= -4y^2 - \frac{7}{2}x^{5/2}\end{aligned}$$

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$$\begin{aligned}P &= 17x + 9.3x^2 \\ \frac{dP}{dt} &= 17 \frac{dx}{dt} + 9.3(2) \frac{dx}{dt} \\ &= (17 + 18.6x) \frac{dx}{dt} \\ &= (17 + 18.9(21))(20)\end{aligned}$$