

HW: Pg 217 2,9,11,13,27,41

$$2) y = x^3 \quad x = 1$$

$$dy = f'(x) \Delta x$$

$$dy = 3x^2 \Delta x$$

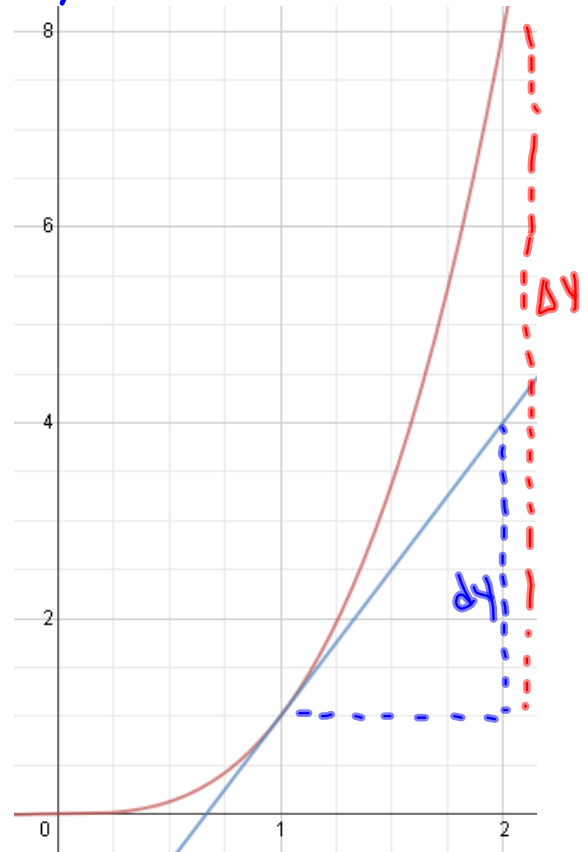
$$dy = 3(1)^2(1) \Rightarrow dy = 3$$

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$$dx = \Delta x = 1$$

$$\begin{aligned} \Delta y &= f(x + \Delta x) - f(x) \\ &= f(2) - f(1) \\ &= 8 - 1 = 7 \end{aligned}$$



$$a) \quad y = 4x^3 - 7x^2$$

$$\frac{dy}{dx} = 12x^2 - 14x \quad dy = (12x^2 - 14x) dx$$

$$ii) \quad y = x\sqrt{1-x}$$

$$f'(x) = x \frac{1}{\sqrt{1-x}} (-1) + (\sqrt{1-x}) \cdot 1$$

$$= -\frac{x}{\sqrt{1-x}} + \sqrt{1-x}$$

$$dy = \left( \sqrt{1-x} - \frac{x}{\sqrt{1-x}} \right) dx$$

$$13) \quad y = x^3 \quad x_0 = 1$$

$$\frac{dy}{dx} = 3x^2$$

$$a) \quad f(x) \approx f(x_0) + f'(x_0)(x - x_0)$$

$$f(x) \approx 1 + 3(x - 1)$$

$$\approx 1 + 3x - 3$$

$$\approx 3x - 2$$

$$c) \quad (1.02)^3 \quad x_0 = 1 \quad \Delta x = .02$$

$$\Rightarrow f(x + \Delta x) \approx 1 + 3(\Delta x)$$

$$(1.02)^3 \approx 1 + 3(.02)$$

$$\approx 1.06$$

$$\text{Calculator} = 1.06123 \dots$$

$$27) \quad (3.02)^4$$

$$f(x) = x^4$$

$$x_0 = 3$$

$$f'(x) = 4x^3$$

$$\Delta x = .02$$

$$41) \quad y = \sqrt{3x-2}$$

$$x_0 = 2 \quad x_1 = 2.03$$

$$dy = f'(x) dx$$

$$\begin{aligned} dy &= \frac{3}{2\sqrt{3x-2}} dx \\ &= \frac{2}{2\sqrt{6-2}} (.03) \\ &= \frac{.03}{2} = .015 \end{aligned}$$

$$\begin{aligned} f'(x) &= \frac{1}{2} (3x-2)^{-\frac{1}{2}} \cdot 3 \\ &= \frac{3}{2\sqrt{3x-2}} \end{aligned}$$

$$f(2) = 2$$

$$f(2.03) \approx 2.015$$

$$\text{calculator} \approx 2.022$$