

13-April-2026

*) $y = 8x^2 + \frac{2}{x}$ 1 stat. point

$$x^n = nx^{n-1}$$

$$y = 8x^2 + 2x^{-1}$$

$$\frac{dy}{dx} = 8 \times 2x^1 + 2 \times (-1)x^{-2}$$

$$\frac{dy}{dx} = 16x - \frac{2}{x^2}$$

$$x^1 \left(16x - \frac{2}{x^2} \right) = 0 \times x^2$$

$$16x^3 - 2 = 0$$

$$16x^3 = 2$$

$$x^3 = \frac{2}{16}$$

$$x = \sqrt[3]{\frac{2}{16}} = \sqrt[3]{\frac{1}{8}} = \frac{\sqrt[3]{1}}{\sqrt[3]{8}} = \frac{1}{2}$$

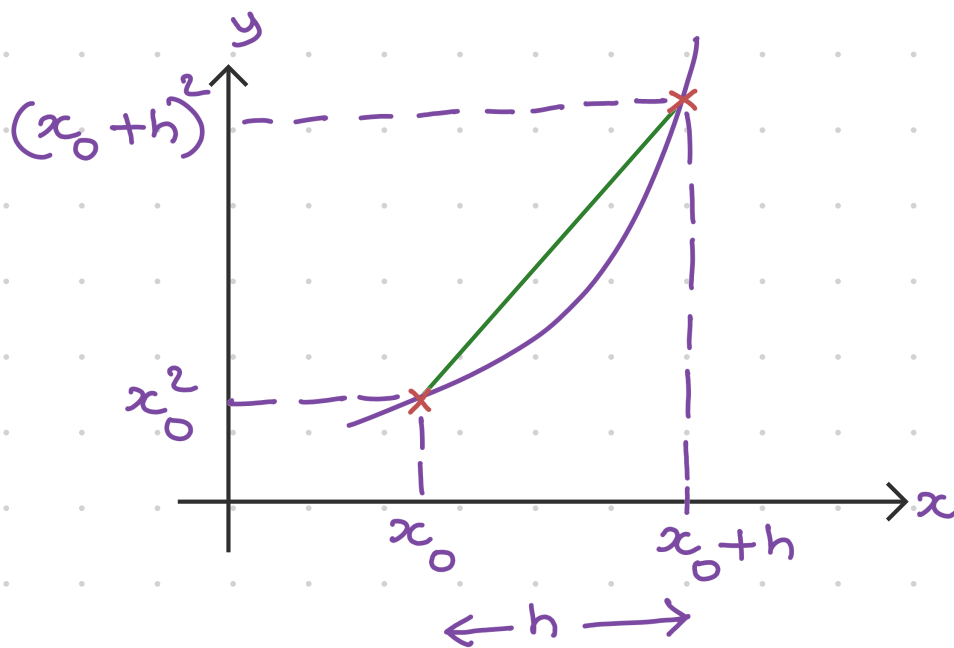
$$x = \frac{1}{2}$$

$$y = 8x^2 + \frac{2}{x} = 8\left(\frac{1}{2}\right)^2 + \frac{2}{\frac{1}{2}}$$

$$y = 6$$

$\left(\frac{1}{2}, 6\right) \rightarrow \text{stat. point}$

$$*) \quad y = x^2$$



$$m = \frac{\Delta \text{ in } y}{\Delta \text{ in } x} = \frac{(x_0 + h)^2 - x_0^2}{h}$$

$$= \lim_{h \rightarrow 0} \frac{(x_0 + h)^2 - x_0^2}{h}$$

$$= \lim_{h \rightarrow 0} \frac{\cancel{x_0^2} + 2x_0h + h^2 - \cancel{x_0^2}}{h}$$

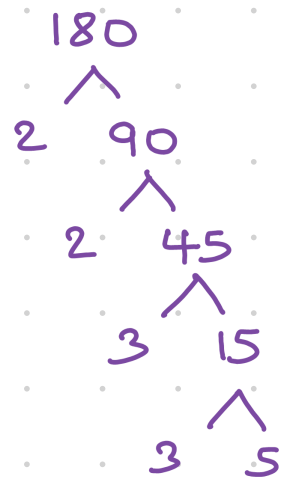
$$= \lim_{h \rightarrow 0} \frac{\cancel{h}(2x_0 + h)}{\cancel{h}}$$

$$= \lim_{h \rightarrow 0} 2x_0 + h$$

$$m = 2x_0$$

$$\textcircled{*} \quad \frac{30 \times 25^{2x+7}}{\sqrt{180} \times (\sqrt{5})^{4x+9}}$$

$$\begin{aligned} \sqrt{180} &= \sqrt{2^2 \times 3^2 \times 5} \\ &= \cancel{\sqrt{2^2}} \times \cancel{\sqrt{3^2}} \times \sqrt{5} \\ &= 6\sqrt{5} \end{aligned}$$



$$\frac{\overset{5}{\cancel{30}} \times (5^2)^{2x+7}}{\underset{1}{\cancel{6}}\sqrt{5} \times (\sqrt{5})^{4x+9}}$$

$$= \frac{5 \times 5^{4x+14}}{5^{\frac{1}{2}} \times 5^{2x+\frac{9}{2}}}$$

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

$$4x + 15 - (2x + 5)$$

$$= 5$$

$$= 5 \quad 4x + 15 - 2x - 5$$

$$= 5 \quad 2x + 10$$

* B, R

$$4R = B,$$

$n \geq 2$, with replacement

$$\frac{B}{R} = \frac{4}{1}$$

$$P(B) = \frac{4}{5}, \quad P(R) = \frac{1}{5}$$

$$P(A \mid B) = \frac{4}{5} \times \frac{4}{5} \times \frac{4}{5} \times \dots = \left(\frac{4}{5}\right)^n$$

OR

$$P(A \mid R) = \frac{1}{5} \times \frac{1}{5} \times \frac{1}{5} \times \dots = \left(\frac{1}{5}\right)^n$$

$$P(A \mid B \text{ or } A \mid R) = \left(\frac{4}{5}\right)^n + \left(\frac{1}{5}\right)^n$$

$$= 1 - \left[\left(\frac{4}{5} \right)^n + \left(\frac{1}{5} \right)^n \right]$$

$$= 1 - \left(\frac{4}{5} \right)^n - \left(\frac{1}{5} \right)^n$$



The displacement, s m, of a particle after t s from a fixed point O is given by

$$s = 5t^2 - \frac{4}{t} + 1$$

After a time of 2 s find the particle's

a velocity in m/s

b acceleration in m/s^2

$$\frac{\Delta \text{ in } y}{\Delta \text{ in } x} = \frac{\Delta \text{ in displacement}}{\Delta \text{ in time}} = \text{velocity}$$

$$s = 5t^2 - 4t^{-1} + 1$$

$$v = \frac{ds}{dt} = 5 \times 2t^1 - 4 \times (-1)t^{-2}$$

$$v = 10t + \frac{4}{t^2}$$

$$\text{At } t=2, \quad v = 10(2) + \frac{4}{2^2} = 21 \text{ m/s}$$

$$v = 10t + 4t^{-2}$$

$$a = \frac{dv}{dt} = 10 \times 1t^0 + 4 \times (-2)t^{-3}$$

$$a = 10 - \frac{8}{t^3}$$

$$\text{At } t=2, \quad a = 10 - \frac{8}{2^3} = 9 \text{ m/s}^2$$

$$\frac{\Delta \text{ in velocity}}{\Delta \text{ in time}} = \frac{\frac{\text{mi}}{\text{hr}}}{\frac{\text{hr}}{1}} = \frac{\text{mi}}{\text{hr}} \times \frac{1}{\text{hr}} = \frac{\text{mi}}{\text{hr}^2}$$

