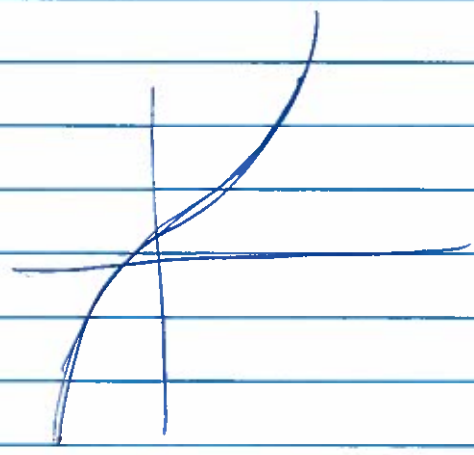


$$\frac{64}{9} x^{-2/3} - \frac{8}{3} x^{-5/3} \leq 0$$

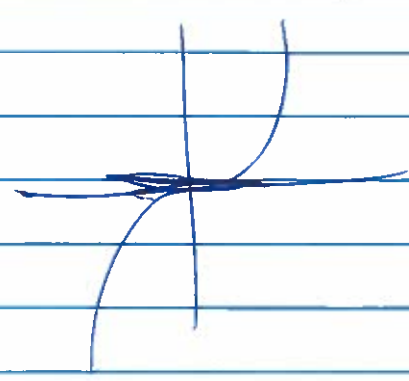
$$x^{-5/3} \left(\frac{64}{9} x - \frac{8}{3} \right)$$

$$\frac{64x}{9} = \frac{8}{3}$$
$$x = \frac{8 \cdot 3}{64} = \frac{3}{8}$$



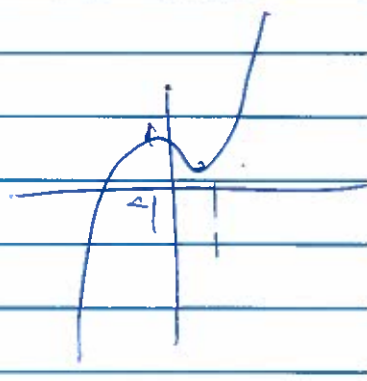
$$y = x^3 + x$$

$$y' = 3x^2 + 1$$



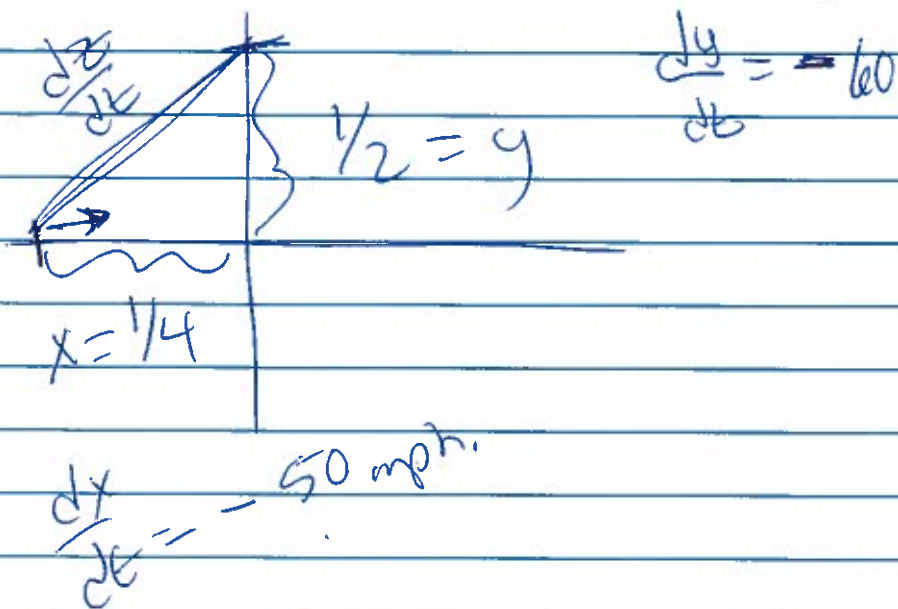
$$y = x^3$$

$$y' = 3x^2 = 0$$
$$x = 0$$



$$y = x^3 - 3x$$

$$y' = 3x^2 - 3$$
$$x = 1, -1$$



$$x \frac{dz}{dt} + y \frac{dy}{dt} = z \frac{dz}{dt}$$

$$\left(\frac{1}{4}\right)(50) + \left(\frac{1}{2}\right)(-60) = \frac{\sqrt{5}}{16} z^2$$

$$\left(\frac{1}{2}\right)^2 + \left(\frac{1}{4}\right)^2 = z^2$$

$$\frac{1}{4} + \frac{1}{16} =$$

$$\frac{5}{16} = z^2 \quad \frac{\sqrt{5}}{16}$$

$$f(x) = x^3 + 2x^2$$

$$[0, 5]$$

$$\text{AVERAGE RATE} = \frac{\Delta y}{\Delta x} = \frac{5^3 + 2(5^2) - 0}{5 - 0} = \frac{175}{5} = 37$$

$$\text{Instant Rate} = 3x^2 + 4x = 37$$

$$3x^2 + 4x - 37 = 0$$

$$x = \frac{-4 \pm \sqrt{4^2 - 4(3)(-37)}}{2(3)}$$

$$x = -4.2 \dots 2.40 \dots$$

$$\sin\left(\frac{\pi}{2}\right) = \approx \sin(\pi) \approx 0$$

$$y\left(\frac{\pi}{2}\right) = -\frac{\pi}{2} + \pi$$

Point
(center $(\pi, 0)$)

$$m = \frac{y_1 - y}{x_1 - x}$$

$$y_1 - y = m(x_1 - x)$$

$$y = -1(x - \pi) = -x + \pi \dots$$

Slope of Tangent
Line

$$y = \sin(x)$$

$$y' = \cos(x)$$

$$y'(\pi) = \cos(\pi) = -1$$