

Michael Chillemi quiz 3

1. $y = x^3 - 2x + 1$ (4, 57)

$$y = f(x) = x^3 - 2x + 1$$

$$\frac{d}{dx} x^3 - 2x + 1$$

$$\begin{aligned} f(4) &= 3x^2 - 2 \\ &= 3(4)^2 - 2 \\ &= 48 - 2 \\ &= 46 \end{aligned}$$

$$y - f(a) = f'(a)(x - a)$$

$$kx^a = a k x^{a-1}$$

$$3x^2 - 2$$

$$y - 57 = 46(x - 4)$$

$$\begin{aligned} y - 57 &= 46x - 184 \\ +57 & \qquad \qquad +57 \end{aligned}$$

$$y = 46x - 127$$

2. if a ball is thrown into the air with velocity of 51 ft/s the height is given

$$y = 51t - 16t^2 \quad t = 1$$

$$\frac{dy}{dt} = 51 - 32$$

$$= 51 - 32(1)$$

$$= 19 \text{ ft/s}$$

3. no displacement (in meters)

$$S = t^2 - 5t + 18$$

$$V_{\text{ave}} = \frac{S(6) - S(0)}{6 - 0} \quad \frac{S(4) - S(3)}{4 - 3}$$

$$(i) = \frac{4^2 - 5(4) + 18 - 3^2 + 5(3) - 18}{1}$$

$$= 16 - 20 + 18 - 9 + 15 - 18$$

$$= 2 \text{ m/s}$$

(ii)

$$\frac{S(4) - S(3.5)}{4 - 3.5}$$

$$= \frac{4^2 - 5(4) + 18 - 3.5^2 + 5(3.5) - 18}{0.5}$$

$$= \frac{16 - 20 + 18 - 12.25 + 17.5 - 18}{0.5}$$

$$= \frac{1.25}{0.5}$$

$$= 2.5 \text{ m/s}$$

$$(iii) \quad \frac{s(5) - s(4)}{5 - 4}$$

$$= \frac{5^2 - 5(5) + 18 - 4^2 + 5(4) - 18}{1}$$

$$= 25 - 25 + 18 - 16 + 20 - 18$$

$$= 4 \text{ m/s}$$

(iv)

$$\frac{s(4.5) - s(4)}{4.5 - 4}$$

$$= \frac{4.5^2 - 5(4.5) + 18 - 4^2 + 5(4) - 18}{0.5}$$

$$= \frac{20.25 - 22.5 + 18 - 16 + 20 - 18}{0.5}$$

$$= \frac{1.75}{0.5}$$

$$= 3.5 \text{ m/s}$$

b) instantaneous velocity $t = 4$

$$V(4) = \frac{ds}{dt}$$

$$= 2(4) - 5 = 8 - 5 = 3 \text{ m/s}$$

4. Part 1 - graph C

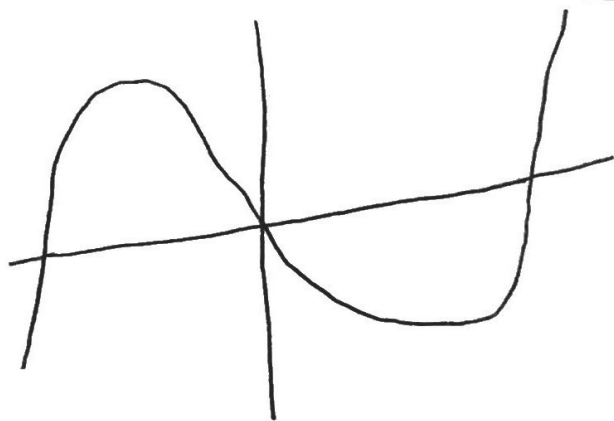
Part 2 - graph I

Part 3 - graph III

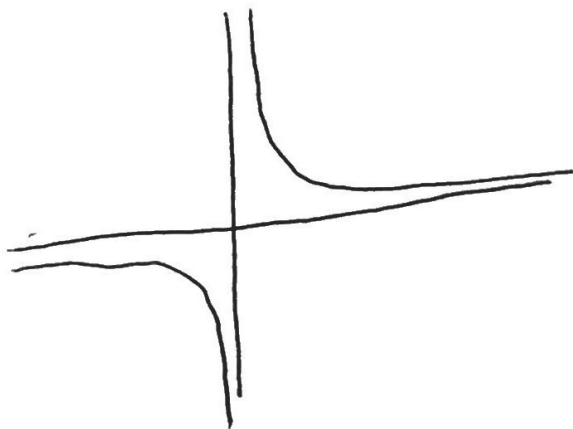
Part 4 - graph II

Part 5 - graph IV

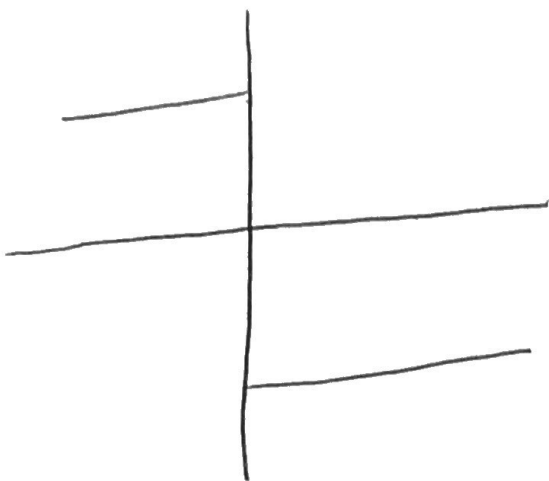
5.



6.



7.



8. Consider parabola

$$y = 4x - x^2$$

$$\lim_{x \rightarrow 1} \frac{4x - x^2 - 3}{x - 1} = \lim_{x \rightarrow 1} \frac{-(x-1)(x-3)}{x-1}$$

$$= \lim_{x \rightarrow 1} (3 - x) = 2$$

$$m = 2$$

$$y - 3 = 2(x - 1)$$

$$y = 2x - 2 + 3$$

$$y = 2x + 1$$