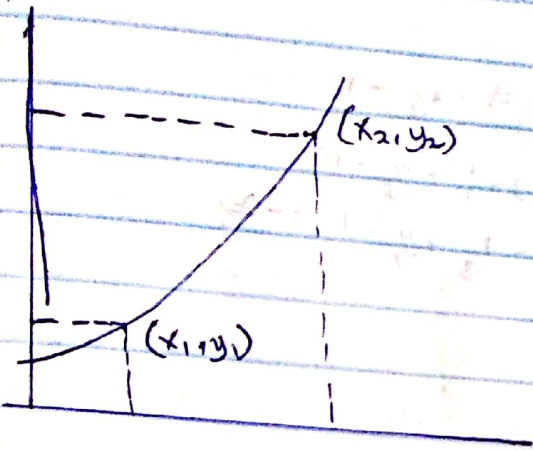


MHFHU Quiz 2a: chapter 2

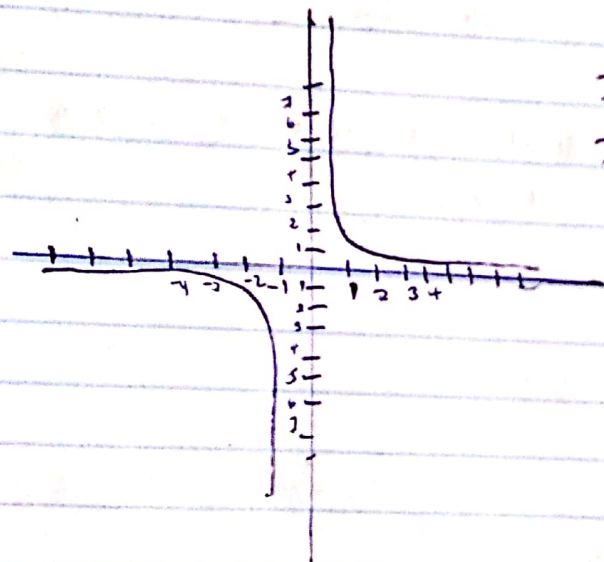
1.



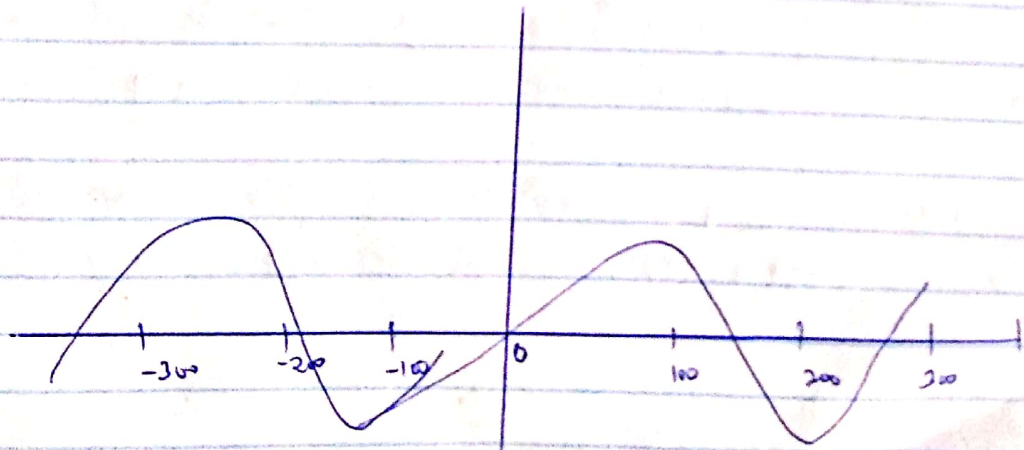
Difference quotient = $\frac{y_2 - y_1}{x_2 - x_1}$

Used to determine the average rate of change over an interval

2.



Interval of decrease: $-\infty \rightarrow \infty$
 Interval of increase: $0 \rightarrow 0$



Interval = $-\infty$ to ∞

decreasing interval $-\pi$ to $\pi/2$
 increasing interval $\pi/2$ to π

3. Speed

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

$$y' = -6x + 2 \Rightarrow y' = 0 \text{ at turning pt}$$

$$-6x + 2 = 0$$

$$-6x = -2$$

$$6x = 2 \Rightarrow x = \frac{1}{3}$$

$$\text{When } x = \frac{1}{3}, y = -3\left(\frac{1}{3}\right)^2 + 2\left(\frac{1}{3}\right) - 1$$

$$y = -\frac{3}{9} + \frac{2}{3} - 1 = -\frac{2}{3}$$

$$\text{Turning pt} = \left(\frac{1}{3}, -\frac{2}{3}\right)$$

$$y'' = -6 \Rightarrow \text{Since } \frac{d^2y}{dx^2} = -6, \text{ this is a maximum pt}$$

5. $j(x) = 3x^2 + ax - 4$

$$\text{Average rate of change} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$\text{When } x = -1, y = 3(-1)^2 + a(-1) - 4 = -3 - a - 4 = -7 - a$$

$$\text{When } x = 2, y = 3(2)^2 + a(2) - 4 = 12 - 4 + 2a = 8 + 2a$$

$$\text{Avg } \Delta = a = \frac{-7 - a}{8 + 2a}$$

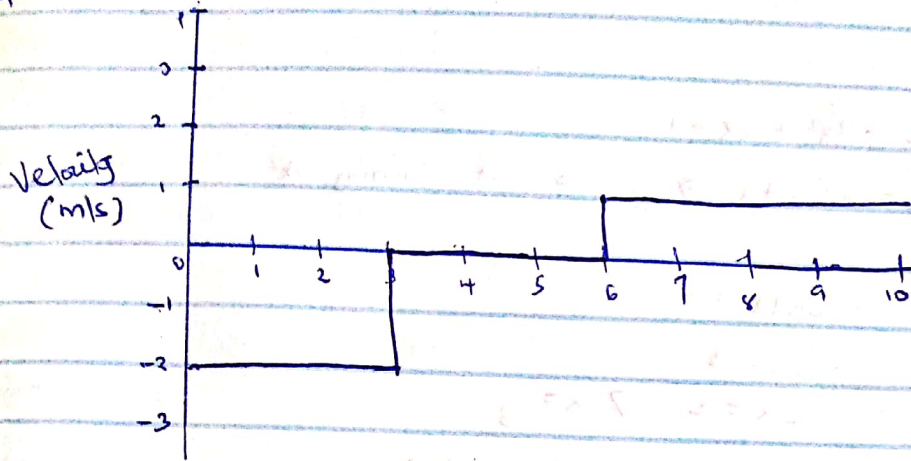
$$72 - 18a = -7 - a$$

$$72 + 7 = 17a$$

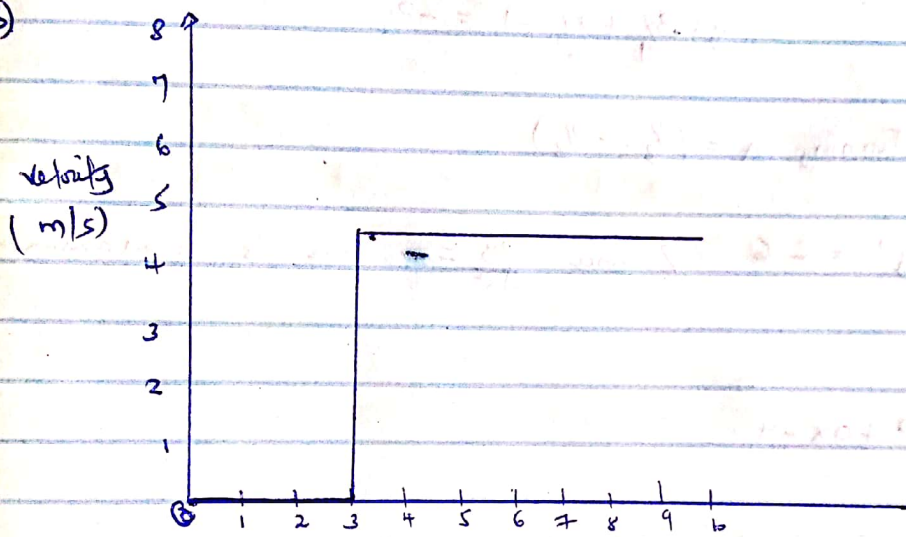
$$79 = 17a$$

$$a = \frac{79}{17}$$

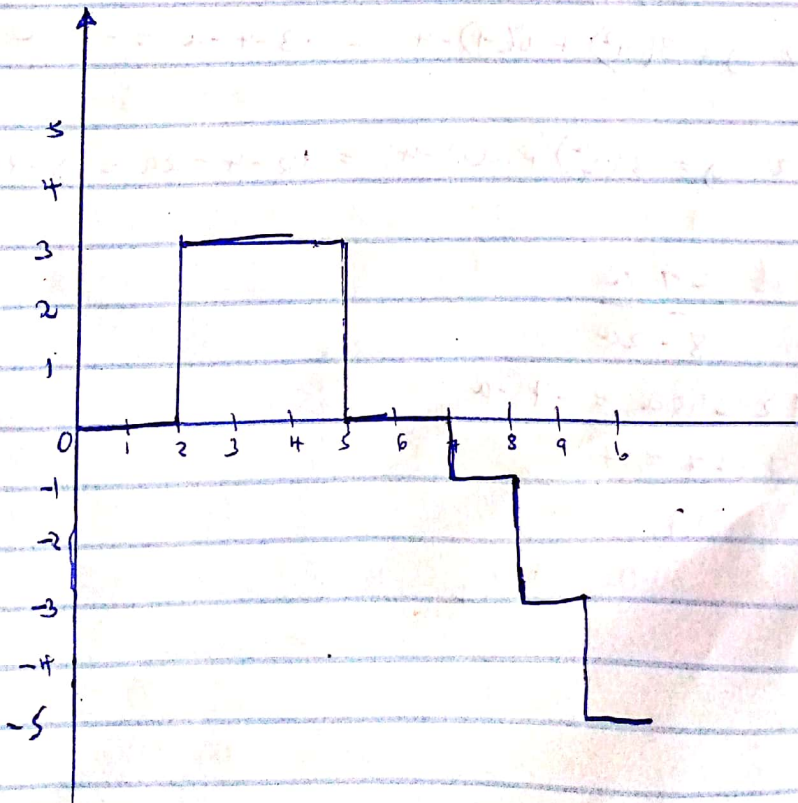
G. A



B)

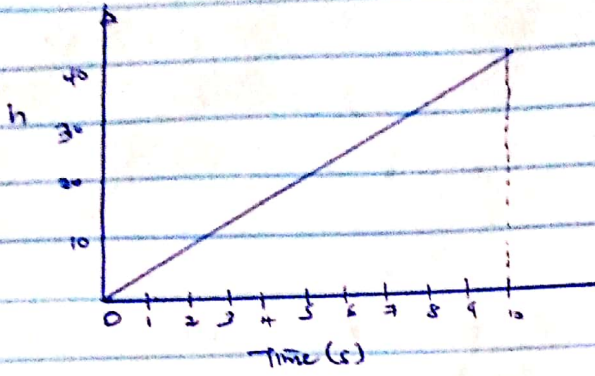


C)



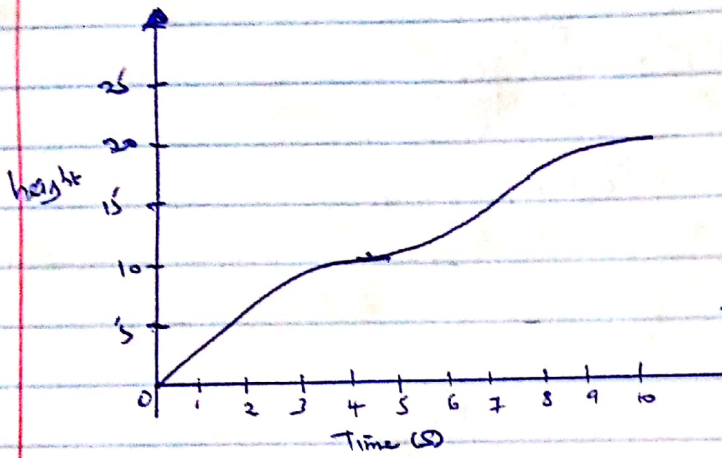
7.

(H)

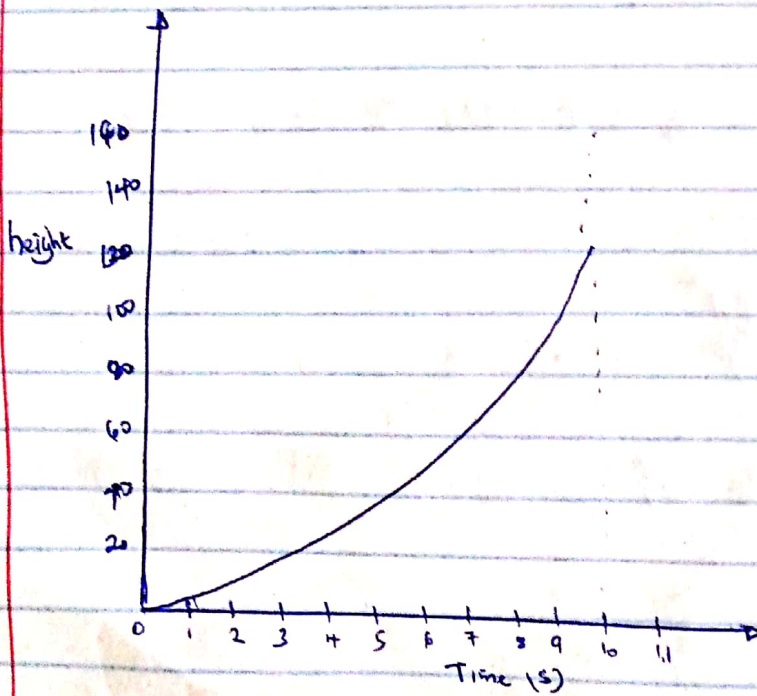


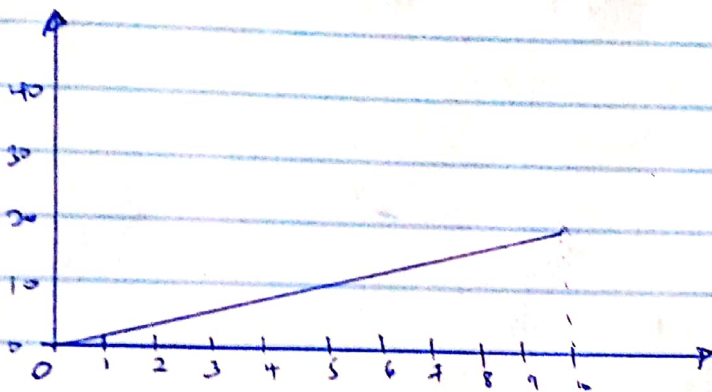
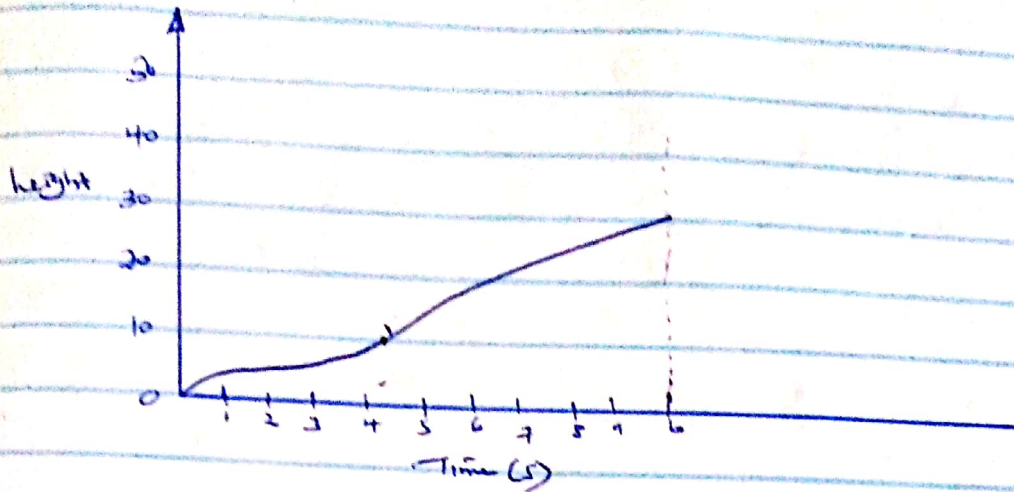
This is D

(D)



(C)





8.
$$\text{Slope} = \frac{\Delta \text{distance}}{\Delta \text{time}} = \frac{5}{15} = 0.3333 \text{ m/s}$$

9.
$$f(x) = 130000 (1.06)^x$$

 when $x = 0$ $f(x) = 130000$

$$f'(x) \text{ of } 130000 (1.06)^x = \frac{130000 \left[(\ln 1.06) - \ln 1.06 \right] 1.06^x}{1.06^x}$$

when $x = 6$

$$f'(x) = \frac{130000 (0.0583) 1.06^6}{1.06^6} = 10745.20$$

$$10. \quad h(t) = t^4 - 4t^3 + t^2 + 6t$$

$$a) \quad h(10) = 10^4 - 4(10^3) + 10^2 + 6(10) = 6160 \text{ m}$$

$$b) \quad h'(t) = 4t^3 - 12t^2 + 2t + 6$$

This $h'(t) = 0$ when $h(t)$ is max

$$4t^3 - 12t^2 + 2t + 6 = 0$$

When $t = 1$

$$4(1^3) - 12(1) + 2(1) + 6 = 0$$

Value of t that gives $h'(t) = 0$ is 1

11. a) Preceding interval 4-5

$$\text{Rate of change} = \frac{104.7 - 67}{5 - 4} = 37.7$$

following interval 5-6

$$\text{Rate of change} = \frac{150.8 - 104.7}{6 - 5} = 46.1$$

$$\text{Avg} = \frac{46.1 + 37.7}{2} = 41.9 \text{ cm}^2/\text{s}$$

$$b) \quad t_1 = 4.9$$

$$t_2 = 5.9$$

$$y_2 = 104.7$$

$$y_1 = 67.$$

$$\text{Rate of change} = \frac{104.7 - 67}{5.9 - 4.9} = 37.7$$

c) They are both estimates i.e. not exact.

12. Tangent line is a straight that just touches a curve at a point while a secant line is a line joining two points of a function (Denotes the average rate of change of a function between two points)

13. The student needs to stop to keep distance constant even with time.