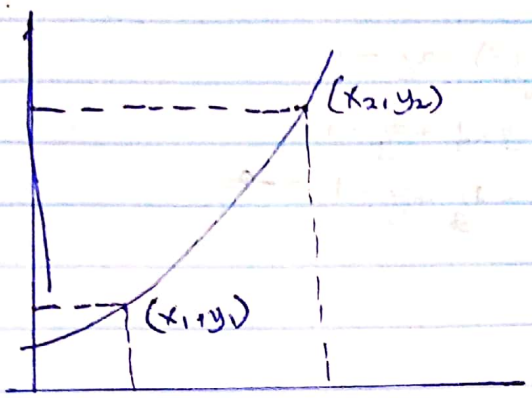
MHFHU Quiz 2a : chapter 2

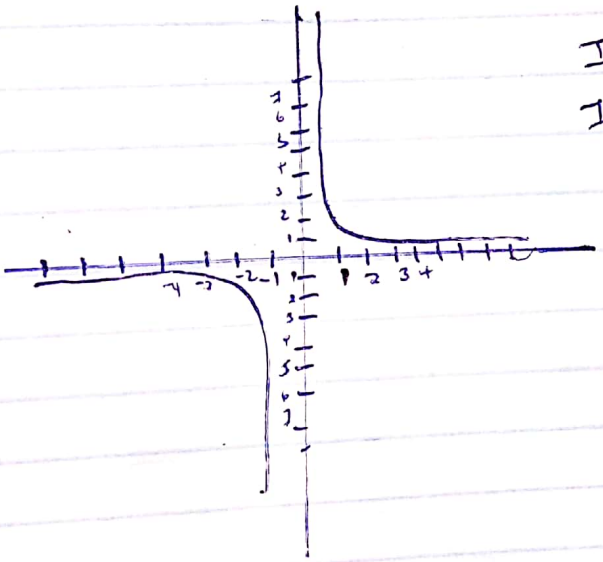
1.



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

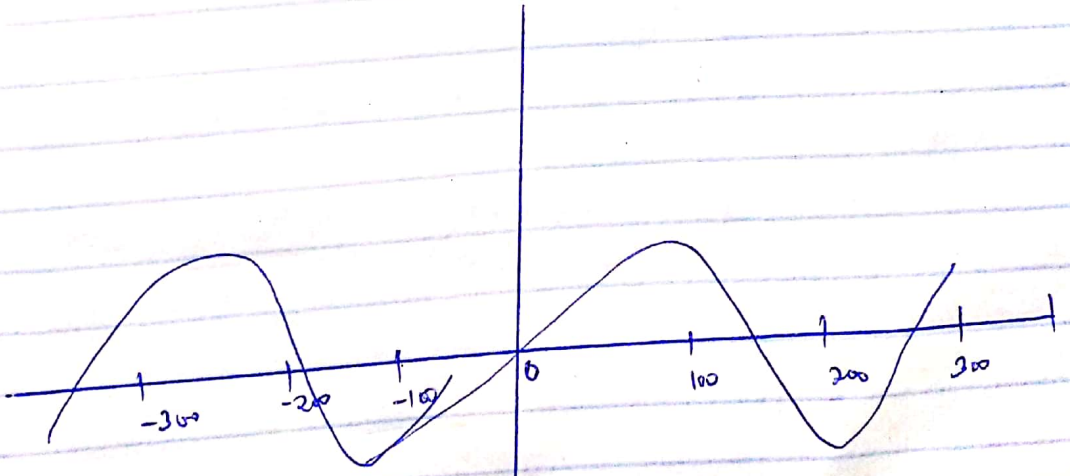
Used to determine the average rate of change over an interval

2.



Interval of decrease : $-\infty \to 0$

Interval of increase $0 \to \infty$



Interval $= -\infty$ to ∞

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

Increasing interval $\pi/2$ to π

Scanned with CamScanner

3. Speed

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

$y' = -6x + 2 \Rightarrow y' = 0$ at Turning pt

$-6x + 2 = 0$

$-6x = -2$

$6x = 2 \Rightarrow x = 1/3$

When $x = 1/3$, $y = -3(1/3^2) + 2(1/3) - 1$

$y = -3/9 + 2/3 - 1 = -2/3$

Turning pt $= (1/3, -2/3)$

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

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

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

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

when $x = 2$ $y = 3(2^2) + a(2) - 4 = 12 - 4 - 2a = 8 - 2a$

Avg $\Delta = 9 = \frac{-7 - a}{8 - 2a}$

$72 - 18a = -7 - a$

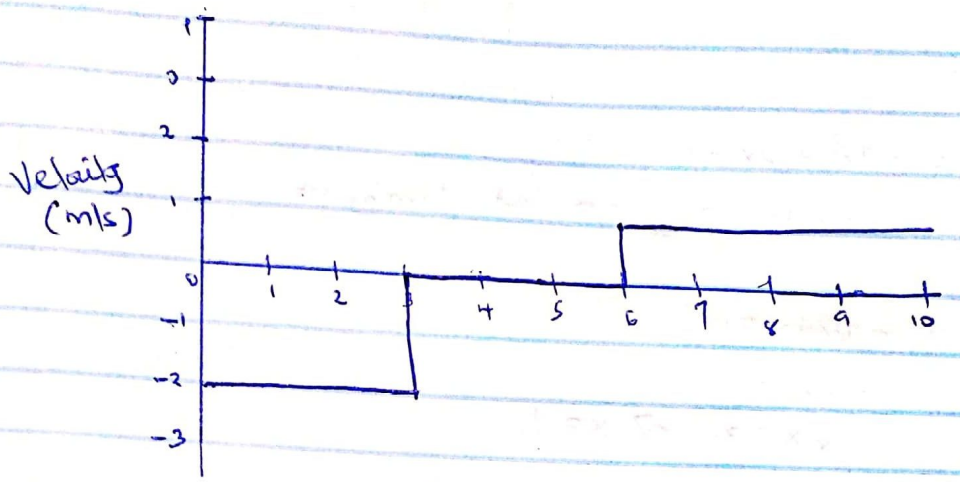
$72 + 7 = 17a$

$79 = 17a$

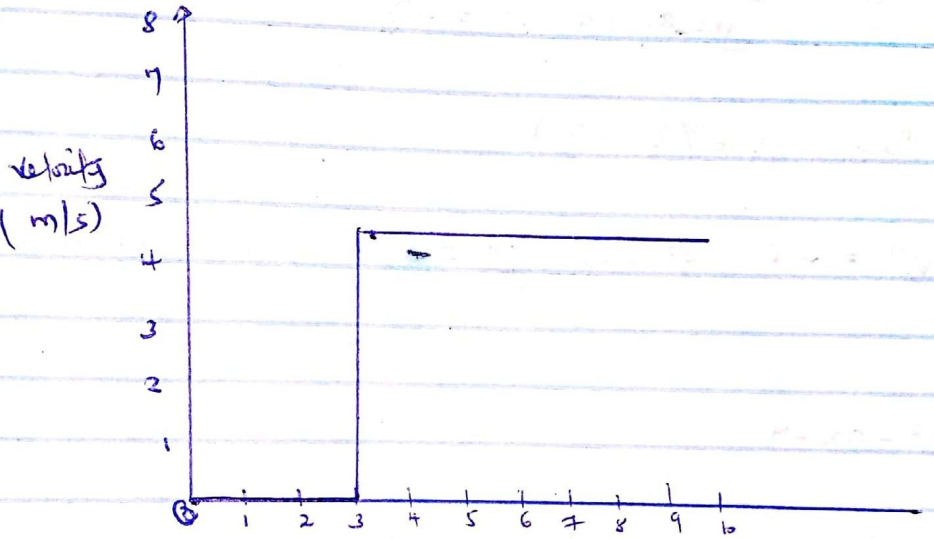
$a = 79/17$

Scanned with CamScanner

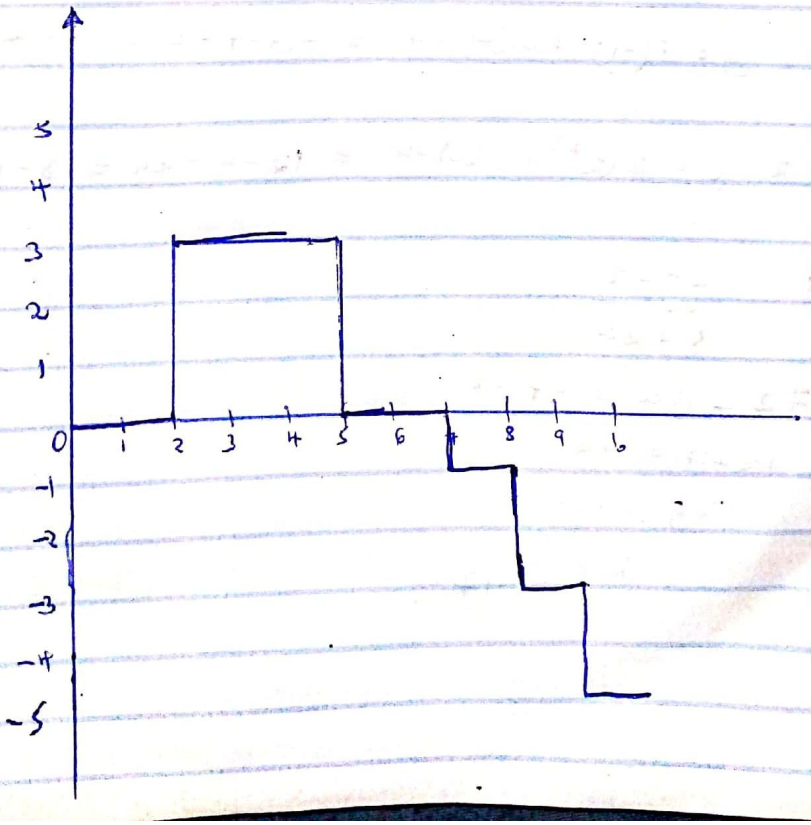
6. A



B)



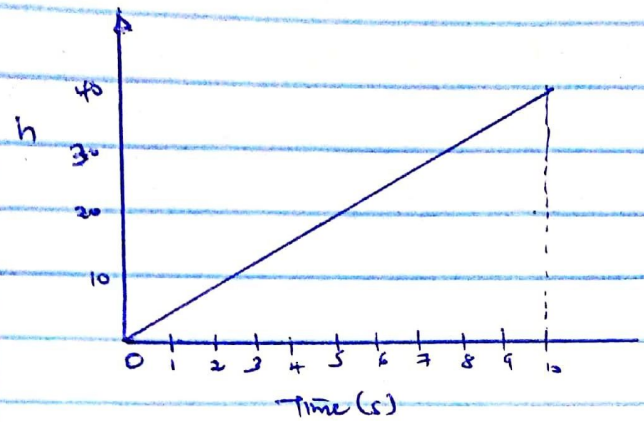
C)



Scanned with CamScanner

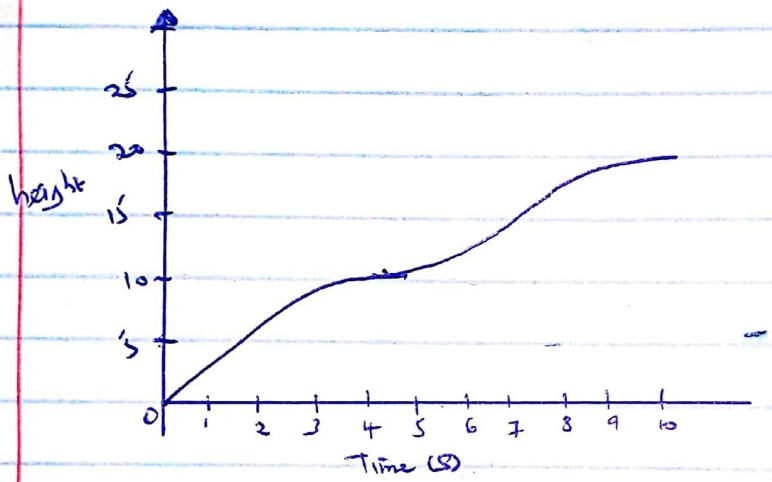
7.

(A)

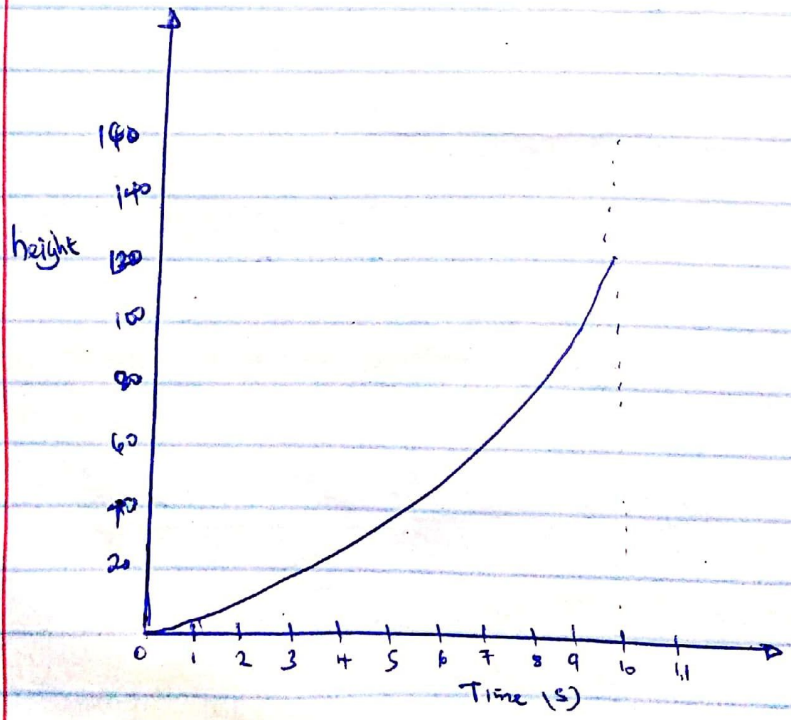


This is D

(B)

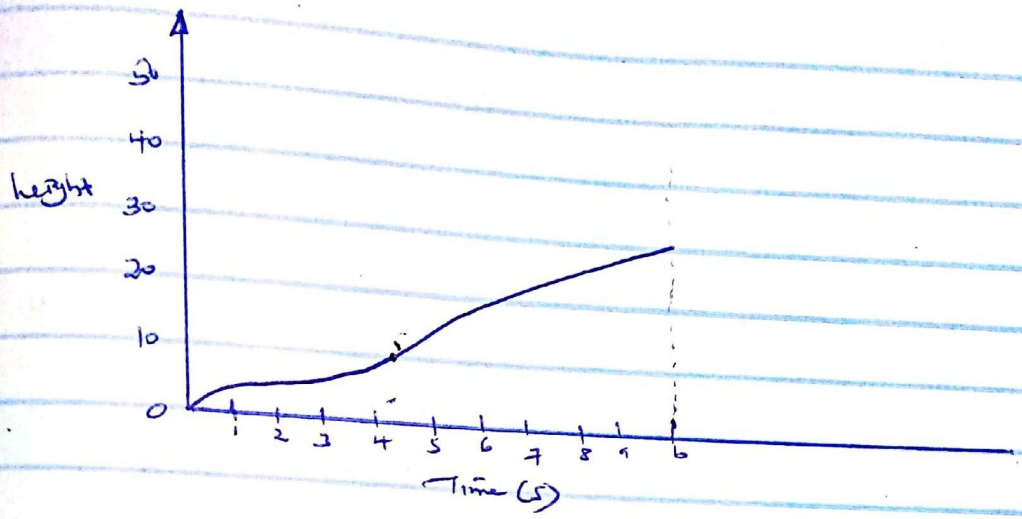


C)

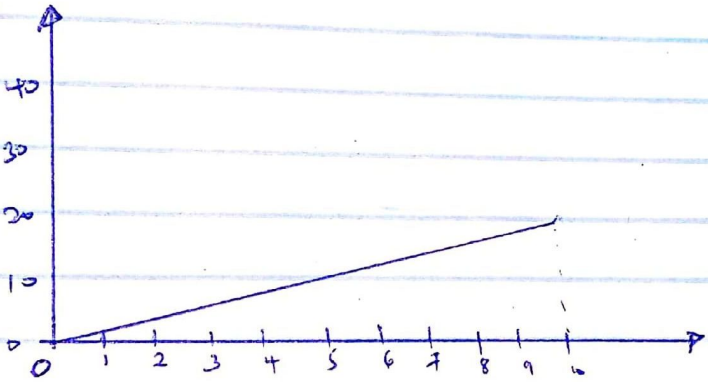


Scanned with CamScanner

(d)



e)



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

$f'(x)$ of $130000\ (1.06)^x = \frac{130000\ [(\ln 53) - \ln 50)\ 53^x}{50^x}$

when $x = 6$

$f'(x) = \frac{130000\ (0.0583)\ 53^6}{50^6} = 10745.20$

Scanned with CamScanner

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

a) $h(10) = 10^4 - 4(10^3) + 10^2 + 6(10) = 6160$ m

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

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) Preceeding interval 4-5

Rate of change $= \frac{104.7 - 67}{5 - 1} = 37.7$

following interval 5-6

Rate of change $= \frac{150.8 - 104.7}{1} = 46.1$

$\text{Avg} = \frac{46.1 + 37.7}{2} = 41.9 \text{ cm}^3/\text{s}$

b) $t_1 = 4.9$

$t_2 = 5.9$

$y_2 = 104.7$

$y_1 = 67.$

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

c) They are both estimates ie. not exact.

Scanned with CamScanner

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.

Scanned with CamScanner