	Assignment #04
	Name: Rimsha Amran Class: BSC5-2020 Section:D Rollno: P20-0046 Subject: Maths
Q1	f(x)= x2-4x+5 0≤x≤3, find the Riemann sum with n=6, taking the simple points to be left end points (ii) Right endpoints (iii) Mid points
	we know that
	$\Delta x = b - a$
	So .
	Δ1=3-0 6
	$\Delta x = 1 \text{ ov } 0.5$
1	2
	Now
	$\Delta x_0 = \alpha + \Delta x(0) = 0$
	$x_1 = q + \Delta x(1) = 0.5$
	$\chi_{2} = \alpha + \Delta \times (2) = 1$
	$x_3 = a + \Delta x(3) = 1.5$
	$xy = a + \Delta x(y) = 2$
	$x_5 = a + \Delta x (5) = 2.5$
	$x_6 = a + \Delta x (6) = 3$
	So, .
	f(20)=5
	$f(x_1) = 3.25$

$$f(x_1) = 4.0625$$

$$f(x_2) = 2.5625$$

$$f(x_3) = 1.5625$$

$$f(x_4) = 1.0625$$

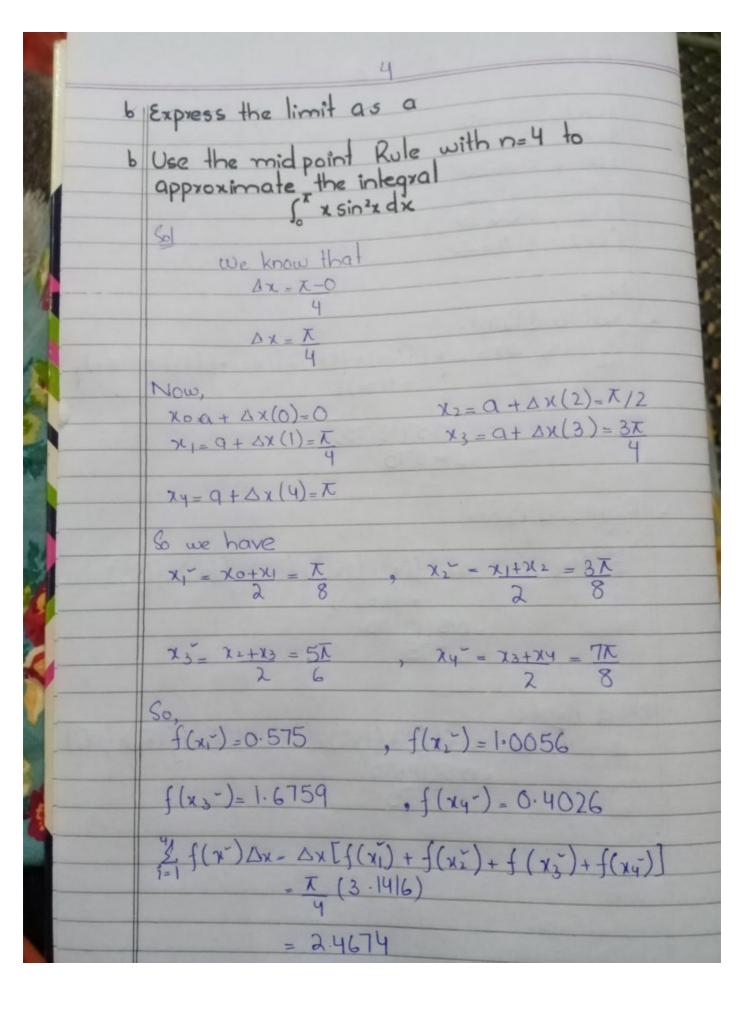
$$f(x_5) = 1.0625$$

$$f(x_5) = 1.0625$$

Now Left End Points $\underset{i=0}{\overset{5}{\text{L}}} f(x_i) \Delta x = \Delta x [f(x_0) + f(x_1) + f(x_2) + f(x_3) + f(x_4)$ $+ f(x_5)]$

- Right End Points:

$$\frac{2}{5} f(x_i) \Delta x = \Delta x \left(f(x_i) + f(x_2) + f(x_3) + f(x_4) + f(x_5) + f(x_6) \right) \\
= 0.5 (10.75) \\
= 5.375$$



Qa Express the integral as a limit of Reimann sum. Donot evaluate the limit

Sol Here a= 2 & b= 5
So, Ax=b-a

= 5 -2

= 3 n

So we have,

 $x_i = q_t(\Delta x)(i)$ $= q_t(\Delta x)(i)$

= 2+3i

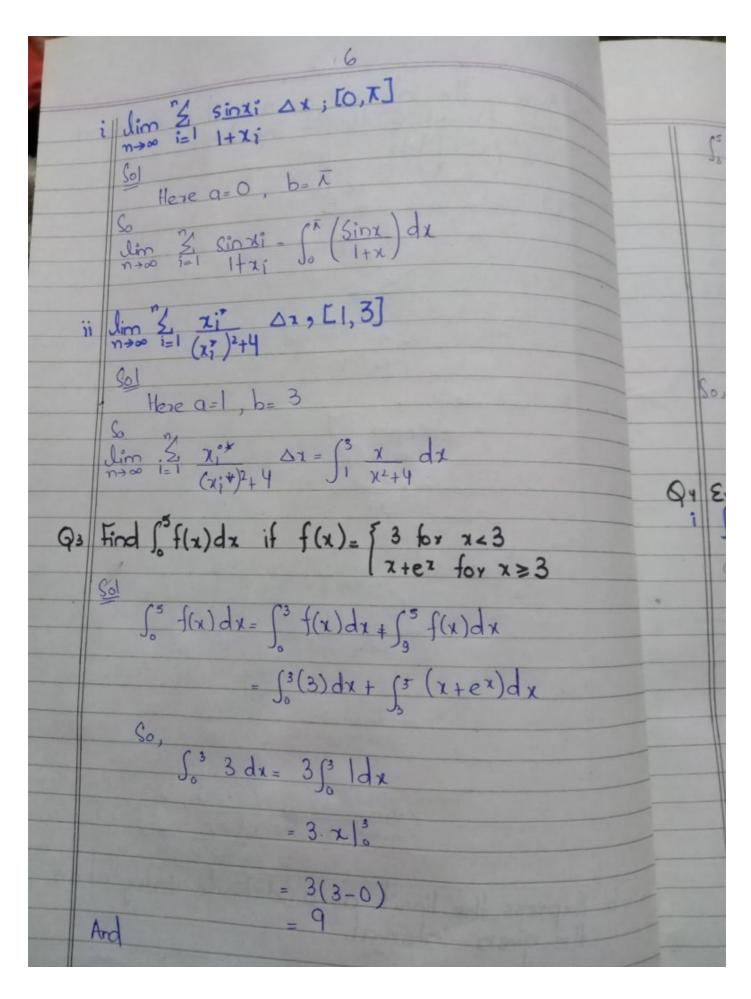
So $\int_{a}^{b} f(x) dx = \lim_{n \to \infty} \sum_{i=1}^{n} f(x_i) \Delta x$

= $\lim_{n\to\infty} \frac{3}{i=1} f\left(2+\frac{3i}{n}\right) \frac{3}{n}$

 $= \lim_{n \to \infty} \frac{1}{i-1} \cdot \left(\frac{G^{i}}{n}\right) \frac{3}{n}$

 $= \lim_{n \to \infty} \frac{3}{n} \underbrace{\begin{cases} \left(\frac{6i}{n}\right)^2 + n}_{i=1} \right)}_{n \to \infty}$

b Express the limit as a definite integral on the given interval.



$$\int_{3}^{5} (x+e^{x}) dx = \int_{3}^{5} x dx + \int_{3}^{5} e^{x} dx$$

$$= \frac{x^{2}}{\lambda} \Big|_{3}^{5} + e^{x} \Big|_{5}^{5}$$

$$= \frac{(5)^{2} - (3)^{2}}{\lambda} + (e^{5} - e^{5})$$

$$= \frac{8 + 13 \cdot 8 \cdot 3}{2 \cdot 136 \cdot 3}$$

$$= 136 \cdot 3$$
So,
$$\int_{0}^{5} f(x) - \frac{9 + 136 \cdot 3}{2 \cdot 145 \cdot 3}$$

$$= \frac{145 \cdot 3}{4 \cdot 145 \cdot 3}$$
Question in legans.
$$\int_{1/2}^{1/2} \frac{4}{\sqrt{1 - x^{2}}}$$

$$= \frac{1}{4} \int_{1/2}^{1/2} \frac{1}{\sqrt{1 - x^{2}}}$$

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$$= \frac{1}{4} \int_{1/2}^{1/2} \frac{1}{\sqrt{1 - x^{2}}}$$

$$= \frac{1}{4} \left(\sin^{-1}(\frac{1}{\sqrt{x}}) - \sin^{-1}(\frac{1}{\lambda}) \right)$$

$$= \frac{1}{4} \left(\frac{\pi - \pi}{4} \right)$$

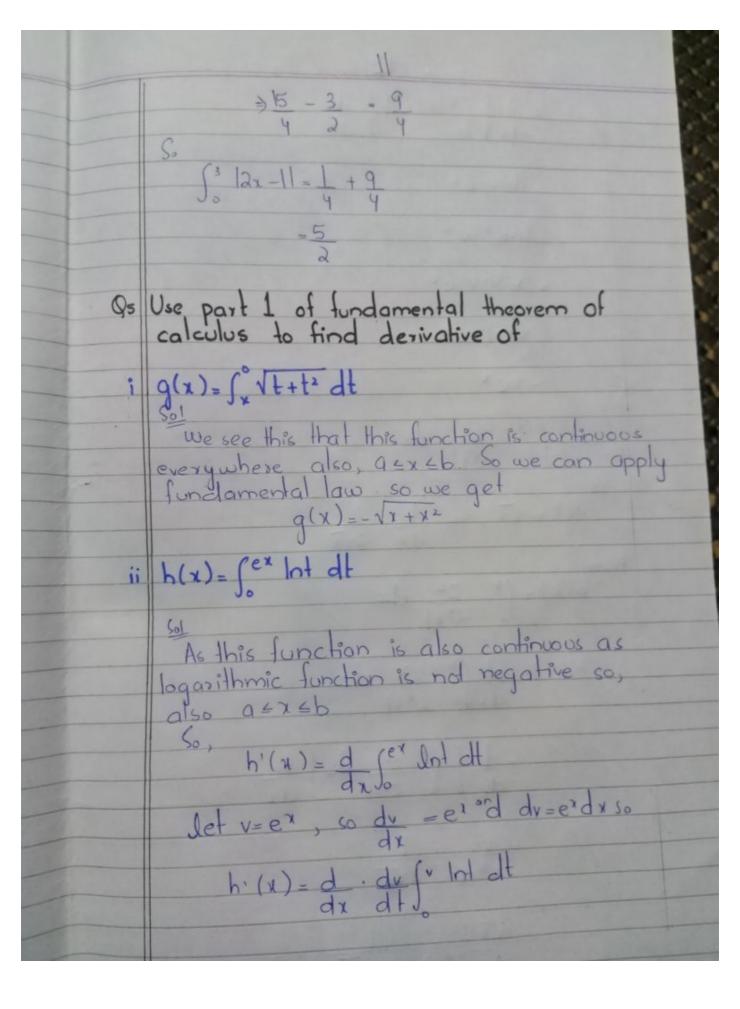
 $=\frac{4}{12}$ ii $\int_0^{x} f(x) dx$, where $f(x) \begin{cases} \sin x & \text{if } 0 \le 2 \le \frac{\pi}{2} \end{cases}$ Sol (x) dx = [1/2 sin xdx + [x cosxdx =- cosu 1 + sinx 1 3 = $- \left[\cos(0) - \cos(\pi/2) \right] + \left[\sin(\pi/2) - \sin(\pi) \right]$ = - (1-0) + (1-0) = - | + | iii f(x)= fo VI + sect dt Sol - SZA VI+sect d+ Multiplying and dividing by Vsat-1 = - SZK Vsect+1 - Vsect-1 Vsect-1 - 52x N sect-1

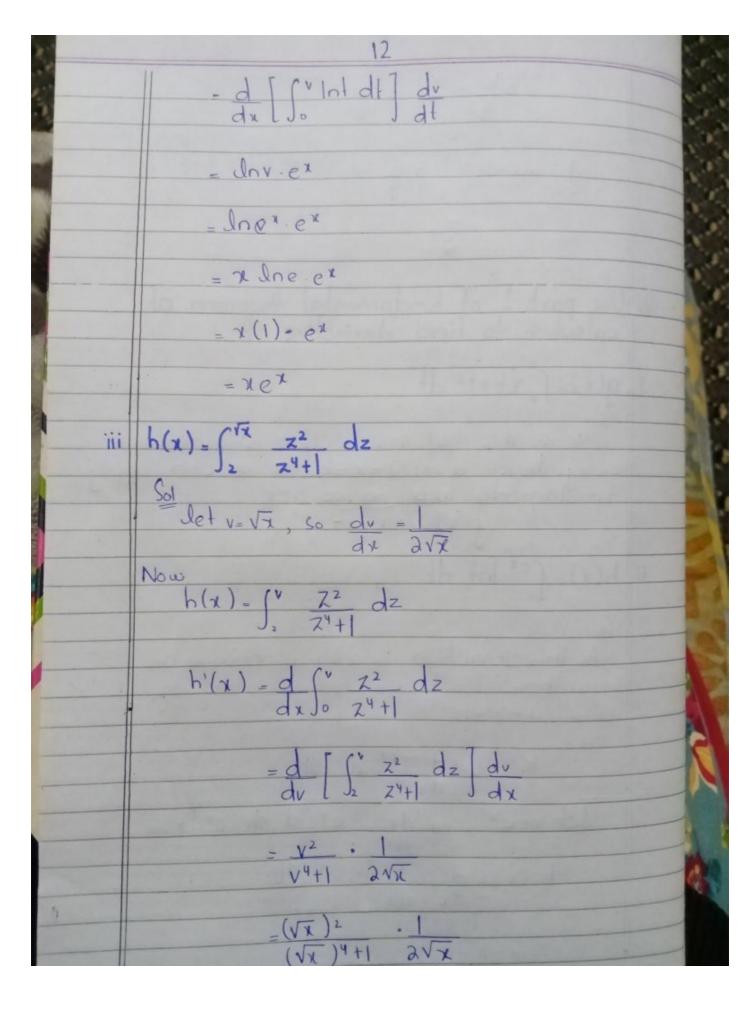
Sol 3 - 2y2-y dy

- 53 (y3 - 2y2 - y) dy

- 51 (y3 - 2y2 - y) dy 53 ydy - 253 ldy - 53 ldy $=\frac{y^2}{12} \left| \frac{3}{1} - 2y \right| \frac{3}{1} - \ln |y| \left| \frac{3}{1} \right|$ $\frac{1}{2}((3)^2-(1)^2)-2(3-1)-(\ln |3|-\ln |1|)$ = 1 (9-1) - 2(2) - 1.15 sino + sin O tan 20 do = 5 x/3 sin0 (1+1an20) do Sec20 = 5th sino secto do secto do secto do = - (050 | 1/3 - (cos (F/3) - cos(O)

	0			
vi	J. 12x-11dx			S.
	$ \int_{0}^{3} $			
	$\int_{0}^{2} 2x-1 dx = \int_{0}^{1/2} (-2x+1) dx + \int_{1/2}^{2} (2x-1) dx$			Use p calc
	$\int_{0}^{1/2} (-2x+1) dx = -2 \int_{0}^{1/2} x dx + \int_{0}^{1/2} dx$		1	9(x)
	$=-2\left(\frac{\chi^2}{\lambda}\right)^{1/2}+\lambda^{1/2}$	-		fun
	$=-((1/2)^2-(0)^2)+(1/2-0)$		ii	h(x
	$=-\frac{1}{4}+\frac{1}{\lambda}$			Sol
ACMINISTRATION OF THE PERSON O	= 1			al
	And now $\int_{1/2}^{2} (dx+1) dx = 2 \int_{1/2}^{2} x dx + \int_{1/2}^{2} dx$	1		
	$= \frac{\chi(\chi^2)}{\chi} _{\gamma_2}^2 + \chi _{\gamma_2}^2$	1		
,	$= [2)^2 - (1/2)^2 + [2-1/2]$			I





iv

$$h(x) = \int_{2x}^{3x} \frac{y^2 - 1}{y^2 + 1} dy$$

$$\int_{2x}^{3x} \frac{y^2 - 1}{y^2 + 1} dy + \int_{0}^{3x} \frac{y^2 - 1}{y^2 + 1} dy$$

Now
$$\int_{2\pi}^{9} \frac{y^2 - 1}{y^2 + 1} = -\int_{0}^{2\pi} \frac{y^2 - 1}{y^2 + 1} dy$$

let v= 2x then dv = 2

-d 5 y2-1 dy

Using chain rule

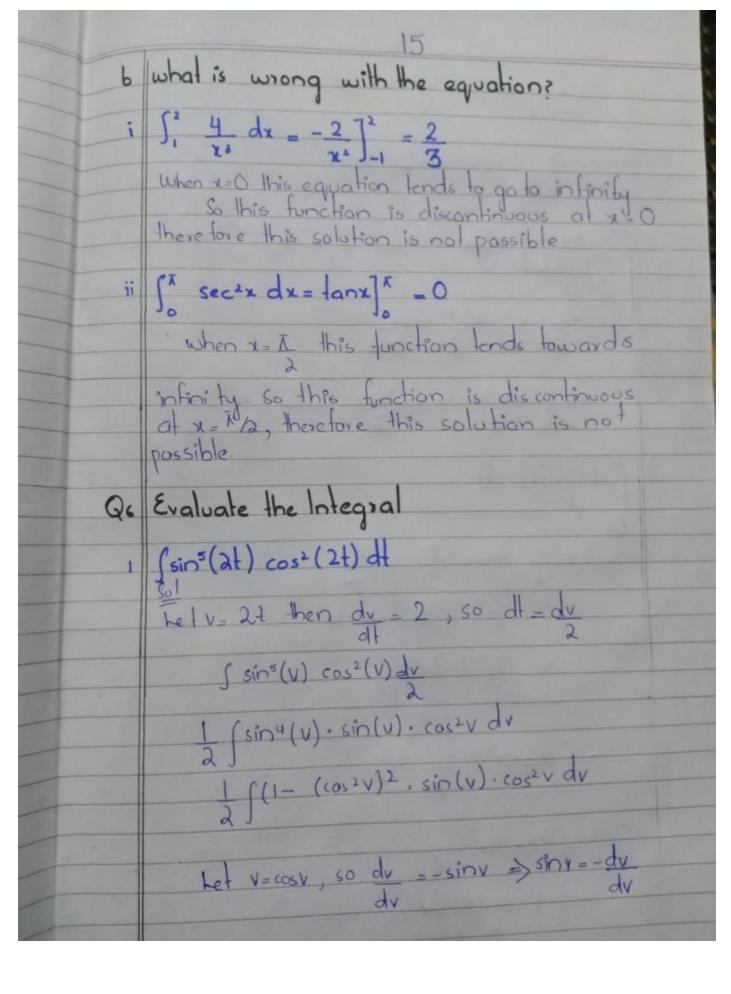
-d [sv y2-1] dv

dv [so y2+1] dx

 $- \left[\frac{V^2 - 1}{V^2 + 1} \right] \frac{7}{2}$

$$= -2 \left[\frac{(2x)^2 - 1}{(2x)^2 + 1} \right]$$

14 -8x2+2 4x2-1 Now 53x y2-1 dy Let v= 3x so dv =3 Taking d = d 50 y2-1 dy Using Chain rule = d [" y2-1] dv dv [0 y2+1] du $= \frac{v^2 - 1}{v^2 + 1} \cdot 3$ =9x2-1 .3 922+1 $= 27x^2 - 3$ $9x^2 + 1$ So, $h'(x) = 27x^2 - 3 - 8x^2 - 2$ $9x^2 + 1$ $4x^2 + 1$



-1 (1-v)2. dv · v2. dx -1 (v2 (1+v4-2v2)dv -1 -1 V2 dv + Sv6 dv - 2 Sv4 dv $\frac{-1}{2}\begin{bmatrix} v^3 + v^7 - 2v^5 \\ 3 & 7 & 5 \end{bmatrix}$ $\frac{-1}{2} \left[\cos^3(21) + \cos^2(21) + 2\cos^5(21) \right]$ ii | sin2(1/t) dt Sinv (-t2dv) - (vxsin2v(1 dv) - 11-cos2V dv

iv 5x/4 VI-cos40 do

Let V= 20 So du= 2do do=du

So - 5 x/4 VI-cos 2v dv

= 1 Sty Vasin2v dv

= 1 5 N/4 Va Vsin2v dv

= Va Jay sinvdv

= - Na cosv / 1/4

= - \(\frac{1}{2}\) \(\left(\os \left(\text{N/Y} \right) - \cos \left(\os \right) \right) \)

 $=-\sqrt{2}\left(\sqrt{2}-1\right)$

= 0.207