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<u> </u>	<u>т Sep 2023</u>
MT1003 Calculus and Analytical	Geometry
1. $f(x) = 5x^3 - 3x^2 + 2x - 1$ $2x^3 - x^2 + 4$	145 / 15 / 15 / 15 M
$2\kappa^2 - \kappa^2 + 4$	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~
Problem 1:	,
	s and established some
	dispers may lex
$\lim_{x \to \infty} f(x) : 5(\infty)^3 - 3(\infty)^2 + 2(\infty) - 1 = \infty$ $2(\infty)^3 - (\infty)^2 + 4$	· Campail
222020	of all a cinac
MASSALIB MASTER CONCOLLEGE	.70
	Andrews Andrews
$\lim_{N\to\infty} f(x) = \frac{5(\infty)^3(\infty)^3 - 3(\infty)^2(\infty)^{-3} + 2(\infty)^2(\infty)^{-3}}{2(\infty)^3(\infty)^{-3} - (\infty)^2(\infty)^{-3} + 4(\infty)^2(\infty)^{-3} + 4(\infty)^2(\infty)^2(\infty)^{-3} + 4(\infty)^2(\infty)^2(\infty)^2(\infty)^{-3} + 4(\infty)^2(\infty)^2(\infty)^2(\infty)^{-3} + 4(\infty)^2(\infty)^2(\infty)^2(\infty)^2(\infty)^2(\infty)^2(\infty)^2(\infty)^2$	$\frac{1}{(\infty)^{-3}} - 1 (\infty)^{-3}$
$\lim_{x\to\infty} f(x) = 5$	Est Santing
2-300	There is no bearing
Horizontal asymptote exists at y= S as it value as x= 00 but never reaches it.	approaches that
	Verticle by apple
(b) $f(x) = 2\pi 2014 5x^3 - 2x^2 + 2x - 1$ $2x^3 - x^2 + 4$	
$2x^3-x^2+4$	21.50
$2\kappa^3 - \kappa^2 + 4=0$	9/8/2 2018
x ≈ -1.113 and x = Two imaginary caluto	No.
V	00 = 0,0 = (20
Function is undefined at approximately	X=1.113 so verticle
asymptote exists there.	15 Too english ver
the windows are the grouph	to re at
21.200	rown burlow the

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(c) $f(x) = 5x^3 - 3x^2 + 2x - 1$ $2x^3 - x^2 + 4 \frac{1}{5/2}$	
$\frac{2x^{3}-x^{2}+4}{-8x^{3}+8x^{2}+2x-1}$	Q1= 5x
Long division does not produce linear diagonal asymptote	equation so no
Problem 2:	
g(x) = sin x	Committee of the State of the S
Horizontal Asymptote	
$\lim_{x\to\infty} f(x) = \sin(\infty) = 2$	
There is no horizontal asymptote and also due to it being a	due to oscillations
Verticale Asymptote:	
× ≠ 0	
$\frac{g(u) = \sin u}{x}$	y conditions and so a
g(o) = sin 0 = 0 Mo The vertical vertical oxymptote X=0 or at the y-anis	e exists at
never touches the aris.	J-57

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Problem 3:

$$h(x) = \frac{3x^2 - 2x + 1}{x^2 + 4x + 4}$$

(a)
$$\lim_{x\to\infty} \frac{(x) - 3(\infty)^2 - 2(\infty) + 1}{(\infty)^2 + 4(\infty) + 4} = \frac{\infty}{\infty}$$

$$\lim_{x\to\infty} h(x) = \frac{3(\infty)^2(\infty)^2 - 2(\infty)(\infty)^{-2} + (1)(\infty)^{-2}}{(\infty)^2(\infty)^{-2} + 4(\infty)(\infty)^2 + 4(\infty)^{-2}}$$

(b)
$$h(x) = 3x^2 - 2x + 4$$

 $x^2 + 4x + 4$

$$x^{2} + 4x + 4 = 0$$

$$x = -b^{\pm} \sqrt{b^{2} - 4ac}$$

$$2a$$

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Problem 4:	
a) $\lim_{x\to 0} x^2 \sin\left(\frac{1}{x}\right)$	Programme
-1 \le cin 1 \le c	1 C - 1 C -
$-1 \leq \sin 1 \leq \frac{1}{x}$ $-x^2 \leq x^2 \sin 1 \leq \frac{1}{x}$	
	100 to 100 - 2 - 200 d 2010
	d + Xid mil
$\lim_{x\to 0} 0 \leq x^2 \sin 1$	≤ O
As $\lim_{x\to 0} -x^2 = \lim_{x\to 0} x^2$	to it when the time
Lim 22°sin 1 =	0
b) Lim La(x)	P + 4 2 + 4 2 + 6 x 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	O - il to roil to the in

 $-\frac{\ln(x)/\cos(x)}{\ln(x)} \leq \ln(x) \leq \frac{\ln(x)}{\ln(x)} \propto \frac{\ln(x)}{\ln(x)} \leq \frac{\ln(x)}{\ln(x)} \leq \frac{\ln(x)}{\ln(x)} \propto \frac{\ln(x)}{\ln(x)} \leq \frac{\ln(x)}{\ln(x)} \leq$

< Lnx < 00

$\frac{1}{x \to 0} \frac{1}{x^2 \cos\left(\frac{1}{x^2}\right)}$
-1 \le cos (1) \le 1
$-\kappa^2 \leq \kappa \cos\left(\frac{1}{\kappa}\right) \leq \kappa^2$
Lim
Lim -22 & 22 cas (1) < 2 Lim 222 x+0
X+O Lim
0 < 22 cos (1) < 0
$\frac{1}{2}$
As lim -x2 = lim x2 = 0;
n->0 n->0
$\lim_{n\to\infty} n^2 \cos\left(\frac{1}{n}\right) = 0$
21-50