Counting Buses

HW #3

1. Dung Le
2. Christina Griscom.

EX. 1.2.2: Use numerical and graphical evidence to conjecture values for each limit. If possible, use factoring to verify your conjecture.

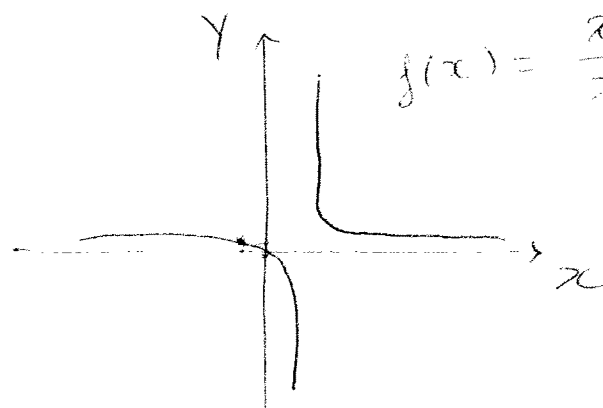
$$\lim_{x \to -1} \frac{x^2 + x}{x^2 - x - 2}$$

$$\lim_{x \to -1} \frac{x(x+1)}{(x-2)(x+1)}$$

$$\lim_{x \to 1} \frac{x}{x-2} = \frac{-1}{-3} = \frac{1}{3} = 0.333\ldots$$

Graph.

$$f(x) = \frac{x^2 + x}{x^2 - x - 2}$$



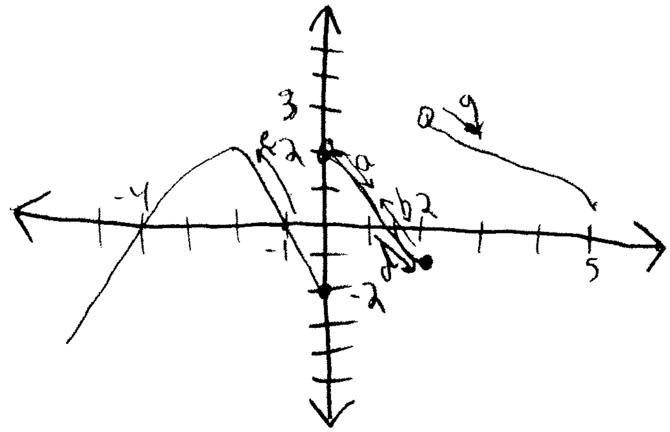
X	Y
$x = -0.935\ldots$	$y = 0.318\ldots$
$x = -0.290\ldots$	$y = 0.1267\ldots$
$x = 0.322\ldots$	$y = -0.016\ldots$
$x = 0.354\ldots$	$y = -0.215\ldots$
$x = 0.677\ldots$	$y = -0.512\ldots$

X	Y
2.612	4.26
2.954	3.137...
4.22..	1.89...
4.548..	1.784...

DGK

+Right   −left

#8



a. $\lim_{x \to 1^-} f(x) = 1$

going to one from left
ends at 1

b. $\lim_{x \to 1^+} f(x) = 1$

going to one from the right
ends at 1

c. $\lim_{x \to 1} f(x) = 1$

coming from both side

d. $\lim_{x \to 2^-} f(x) = -1$

e. $\lim_{x \to -2^+} f(x) = 2$

f. $\lim_{x \to 2} f(x) = \text{DNE}$

g. $\lim_{x \to 3^-} f(x) = 2.5$

h. $\lim_{x \to -3} f(x) = 1.5$

Section 1.2 # 12 Double Helix

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Jamie

(12) Evaluate $F(-1.5)$, $f(-1.1)$, and $f(-1.001)$, and conjecture a value for $\lim_{x\to -1^-} f(x)$ for $f(x) = \frac{x+1}{x^2-1}$. Evaluate $f(-0.9)$, $f(-0.5)$, $f(-0.99)$ and $f(-0.999)$ and conjecture a value for $\lim_{x\to -1^+} f(x) = \frac{x+1}{x^2-1}$. Does $\lim_{x\to -1} f(x)$ exist.

$f(-1.5) = -.4$

$f(-1.1) = -.474\ldots$

$f(-1.01) = -.497\ldots$

$f(-1.001) = -.499\ldots$

$f(-.05) = -.666\ldots$

$f(-0.9) = -.526\ldots$

$f(-0.99) = -.502\ldots$

$f(-0.999) = -.500\ldots$

$y_1 = \cancel{1} = (x+1)/(x^2-1)$

The conjecture is about $-.5$ from both ends.

Section 1.3

DP - Deutsche Produktion

6. $\lim_{x \to 1} \frac{x^2+x-2}{x^2-3x+2} = \frac{1^2+1-2}{1^2-3\cdot 1+2}$

$= \frac{0}{0}$ -> Evaluating the function

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

$\lim_{x \to 1} \frac{x+2}{x-2} = \frac{1+2}{1-2} = \frac{3}{-1}$

INVESTMENT BANKERS

- STEVEN BRUNS
- MAIKO ARANA
- LUIS TINOCO

1.3

14) $$\lim_{x \to 0} \frac{2x}{3-\sqrt{x+9}}$$

$$\rightarrow \frac{2x(3+\sqrt{x+9})}{(3-\sqrt{x+9})(3+\sqrt{x+9})}$$

$$= \frac{2x(3+\sqrt{x+9})}{9-x-9}$$

$$= \frac{2x(3+\sqrt{x+9})}{-x}$$

$$= -2(3+\sqrt{x+9})$$

$$\rightarrow \lim_{x \to 0} -2(3+\sqrt{x+9})$$

$$= -2(3+\sqrt{9})$$

$$= -2(3+3)$$

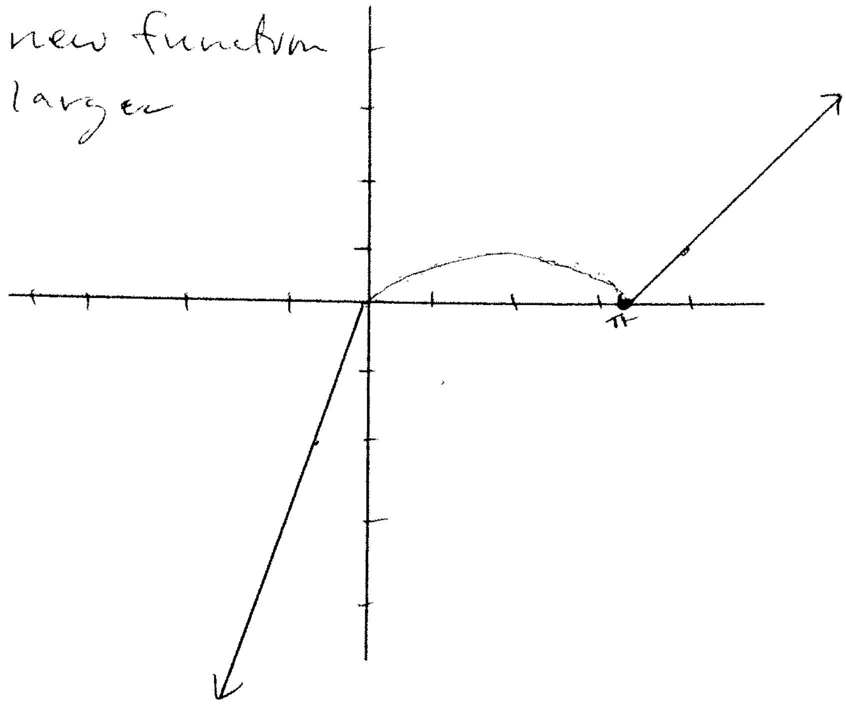
$$= -2(6)$$

$$= \underline{\mathbf{-12}}$$

Ted Condo
Grayson Rogers
Homework 3

I.T. 2/2/11

Determine where f is continuous. Extend f to achieve a new function that is continuous on a larger domain, if possible.



14.)

$$f(x) \begin{cases} 2x \text{ if } x \le 0 \\ \sin x \text{ if } 0 < x \le \pi \\ x-\pi \text{ if } x > \pi \end{cases}$$

1st

$Y_1 = 2X/(X \le 0)$

$\lim\limits_{x \to 0^-} 2x$

$Y_2 = \sin x/(0 < X)/(X \le \pi)$

$\lim\limits_{x \to 0^+} \sin x$

$Y_3 = X - \pi/(X > \pi)$

$\lim\limits_{x \to \pi^+} x-\pi$

2nd:

$\lim\limits_{x \to 0^-} 2x = \lim\limits_{x \to 0^+} \sin x = 0$

$\lim\limits_{x \to \pi^-} \sin x = \lim\limits_{x \to \pi^+} x - \pi = 0$

1.4 #30

MAT FINISHERS

Hiro Tomioka Julian Ward
Mo Shi

30.) Suppose a states income tax code states that tax liability is 12 % on the first \$ 20,000 of taxable earning and 16% on the remainder. Find constants a and b for the tax function.

$$T(x) \begin{cases} 0 & \text{if } x \le 0 \\ a + .12x & \text{if } 0 < x \le 20000 \\ b + .16(x - 20{,}000) & \text{if } x > 20{,}000 \end{cases}$$

EXAMPLE

60,000 yearly payroll for employee

NOTE

a would not have to do with net income TAXES

$(a = 0) + .12(20000) = T(x)$ If $0 < x \le 20000$

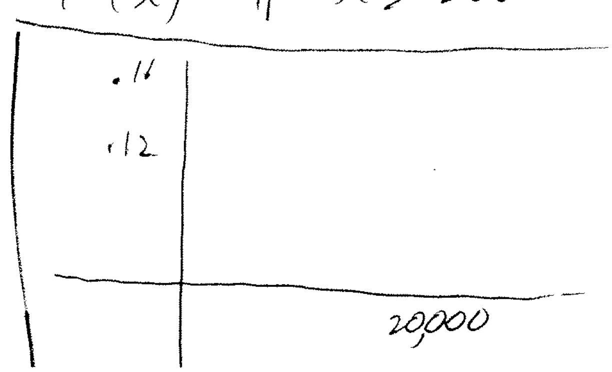
$T(x) = 8800$ if $0 < x \le 20{,}000$

$(b = .12(20000) + .16(60{,}000 - 20000) = T(x)$ if $x > 20000$

$= 2400 + 6400$

$T(60{,}000) = 8800$ if $x > 20{,}000$

$b = 2{,}400$



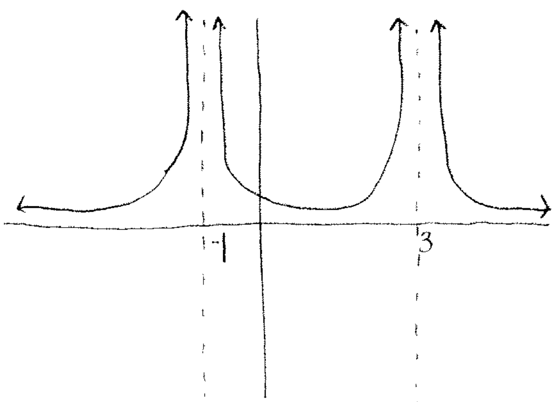
PURPLE PARROTS

Section 1.5 # 6

$$\lim_{x \to -1^-} (x^2 - 2x - 3)^{-2/3}$$

$$\lim_{x \to -1^-} \frac{1}{(x^2 - 2x - 3)^{2/3}} \to \frac{1}{[(x-3)(x+1)]^{2/3}}$$

$x \neq -1$ or 3



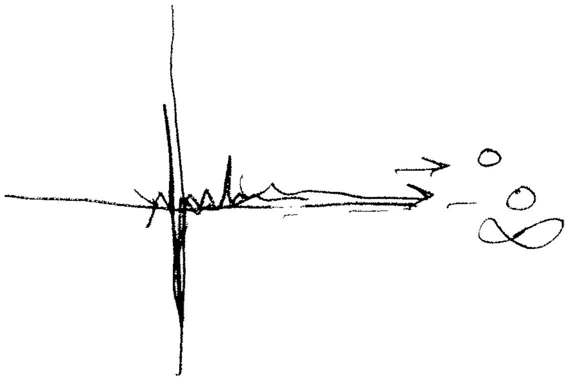
$$\lim_{x \to -1^-} \frac{1}{(x^2 - 2x - 3)^{2/3}} = \infty$$

1.5 #12

XMAS IN July

$$\lim_{x \to \infty} \frac{2x^2-1}{4x^3-5x-1}$$

$Y_1 = (2x^2-1)/(4x^3-5x-1)$



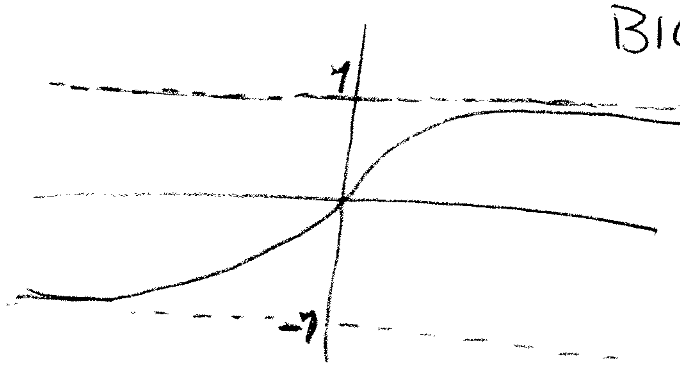
Abraham Sherman Timothy Lukowicz
BIOCHEMIST

1.5
24 (a) $f(x) = x/\sqrt{4+x^2}$

domain all real numbers
horizontal assymptote: $y = \pm 1$
Vertical assymptote: none/DNE

$\lim\limits_{Y \to 1} (x) = \infty$

$\lim\limits_{Y \to -1} (x) = -\infty$



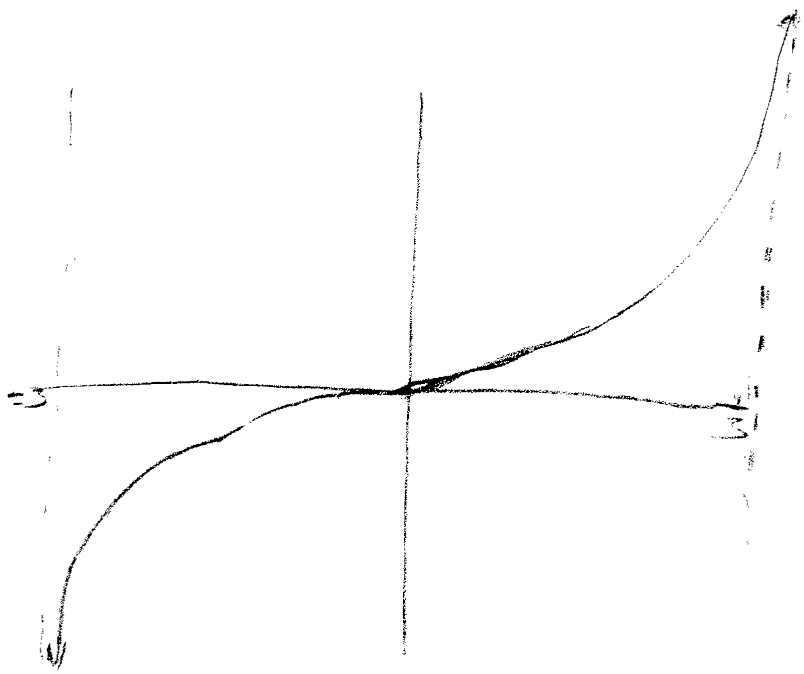
$Y_1 = X/(\sqrt{(4+x^2)})$

(b) $f(x) = x/\sqrt{4-x^2}$

domain $-2 < x < 2$
horizontal Assymptote: none/DNE
Vertical assymptote: $x = \pm 2$

$\lim\limits_{Y \to 3} (Y) = \infty$

$\lim\limits_{X \to -3} (\,) = \infty$



$Y_2 = X/(\sqrt{(4-x^2)})$