Calculus and Probability
Assignment 1

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Exercise 6

a)

$$\begin{aligned} x - x^3 &= 0 \\ &= x(1 - x^2) = 0 \\ &\rightarrow x_1 = -1, x_2 = 0, x_3 = 1 \end{aligned}$$

Values x for which $f(x) = 0 \rightarrow \{-1, 0, 1\}$

b)

$$\begin{aligned} x - x^3 &> 0 \\ &= x(1 - x^2) > 0 \\ &\rightarrow (0, 1), (-\infty, -1) \end{aligned}$$

Values x for which $f(x) > 0 \rightarrow (0, 1), (-\infty, -1)$

Exercise 7

... ...

Exercise 8

a) ... ...

b) ... ...

Exercise 9

a) ... ...

b) ... ...

Exercise 10

a) ... ...

b) ... ...

Exercise 11

a)

$$\begin{aligned}\lim_{x\to 2}\frac{x-2}{x^2+x-6} &= \lim_{x\to 2}\frac{x-2}{(x-2)(x+3)}\\ &= \lim_{x\to 2}\frac{1}{(x+3)}\\ &= \frac{1}{5}\end{aligned}$$

$\lim_{x\to 2}\frac{x-2}{x^2+x-6} = \frac{1}{5}$

b)

$$\begin{aligned}\lim_{x\to 1}\frac{x^2-4x+3}{x^2+x-2} &= \lim_{x\to 1}\frac{(x-1)(x-3)}{(x+2)(x-1)}\\ &= \lim_{x\to 1}\frac{(x-3)}{(x+2)}\\ &= -\frac{2}{3}\end{aligned}$$

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

Answer Form Assignment 1

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Question	**Answer**
6a (1pt)	Values x for which $f(x) = 0 \rightarrow \{-1, 0, 1\}$
6b (1pt)	Values x for which $f(x) > 0 \rightarrow (0, 1), (-\infty, -1)$
7 (1pt)	...
8a (0.5pt)	...
8b (0.5pt)	...
9a (1pt)	...
9b (1pt)	...
10a (1pt)	...
10b (1pt)	...
11a (1pt)	$\lim_{x \to 2} \frac{x-2}{x^2+x-6} = \frac{1}{5}$
11b (1pt)	$\lim_{x \to 1} \frac{x^2-4x+3}{x^2+x-2} = -\frac{2}{3}$