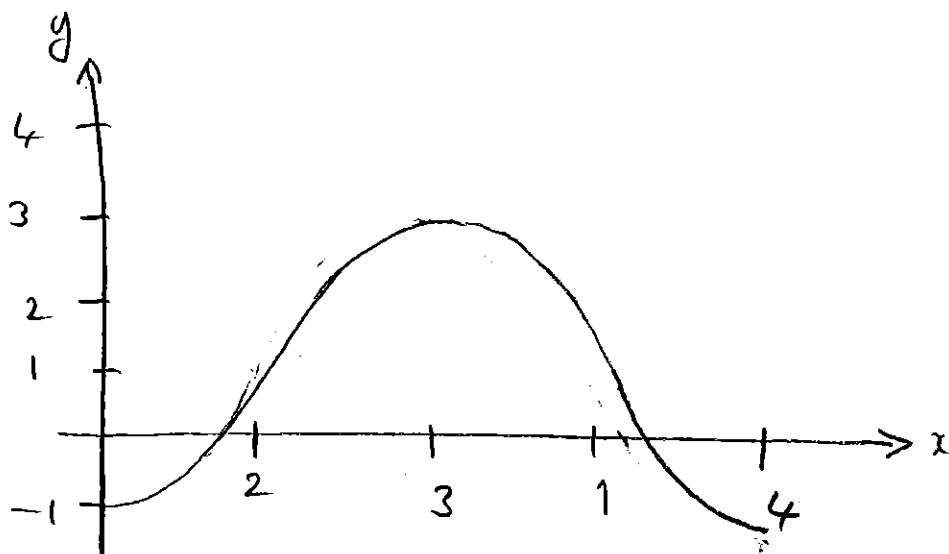


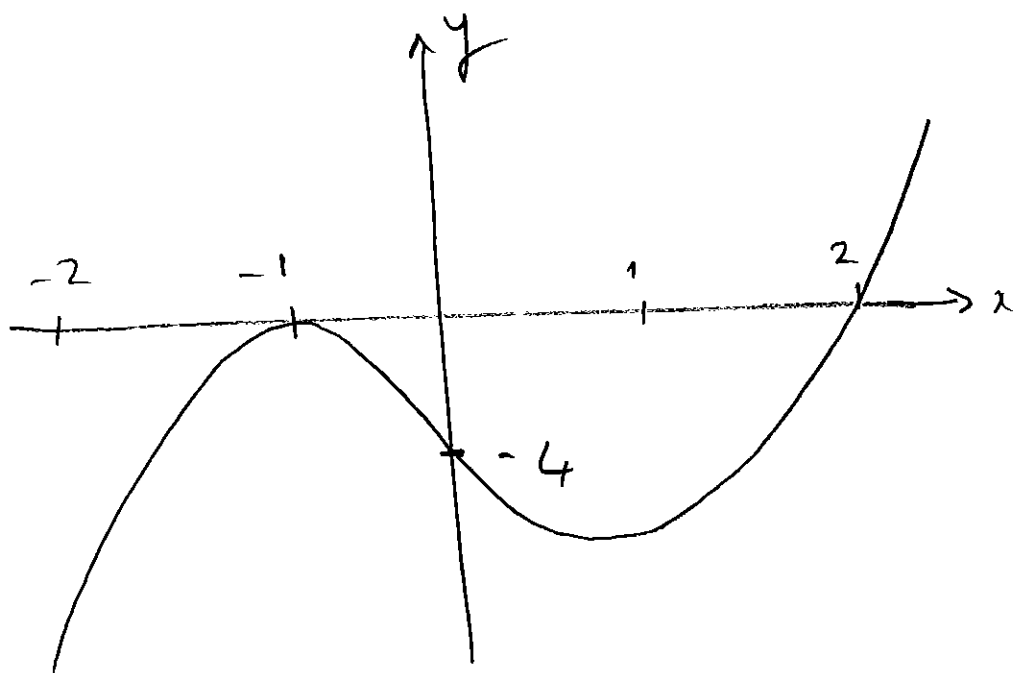
Mth 141 Final Worksheet #1

1. Consider the trigonometric function $f(x)$ with the following graph



- Find the amplitude
- Find the period.
- Give a formula for $f(x)$.

2. Find a formula for the polynomial with the following graph



3. Let $g(x) = x^4 - 3x^2 - x + 1$.

Show that $\exists c, 1 < c < 2$ with $g(c) = 0$.

Justify your answer!

4. Evaluate each of the following limits or show that they do not exist.
Do not use l'Hôpital's rule!

$$\lim_{x \rightarrow 4} \frac{x-4}{x^2-16}$$

$$\lim_{x \rightarrow 4} \frac{\sqrt{x}-2}{x-2}$$

$$\lim_{x \rightarrow 2^-} \frac{\frac{1}{x} - \frac{1}{2}}{x-2}$$

$$\lim_{x \rightarrow 0} \frac{\sin(2x)}{x}$$

given that $\lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$

$$\lim_{x \rightarrow 1} \frac{x^2}{x-1}$$

$$\lim_{x \rightarrow 1} \frac{x-1}{|x-1|}$$

5. Let $f(x) = e^x$

Calculate the average rate of change of f over each of the following intervals

a) $[0, 1]$

b) $[0, .1]$

c) $[0, .01]$

d) Guess the value of $f'(0)$ (which does exist!).

6. Let $g(x)$ be given in the following table

x	0	.1	.2	.3	.4
$g(x)$	.4	.3	.4	.5	.7

Use the table to estimate

a) $g'(1.1)$

b) $g'(.3)$

7. Let

$$h(x) = \begin{cases} kx^2 + 2, & x \leq 2 \\ 2x + k, & x > 2 \end{cases}$$

For what value of k is h continuous at $x=2$?