Math 140 Tutorial 1 Problems

Calculus 1 (McGill University)

Problem Set I : Review of Functions

MATH 140

1. Consider the function $h(x) = \sin(x)$. What is the domain and range of $h(x)$?

2. Find the domain of the following function:

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

3. Determine the domain and range of the function $g(x) = \frac{1}{x+3}$.

4. Sketch the graph of the function $y = 2x^2 - 3x + 1$ over the interval $[-2, 3]$.

5. Draw the graph of the piecewise function $f(x) = \begin{cases} x^2 & \text{if } x < 0 \\ 2x & \text{if } x \geq 0 \end{cases}$.

6. Draw the graph of $y = \frac{1}{x}$ and label any asymptotes.

7. Determine whether the function $y = x^4 - 3x^2 + 2$ is even, odd, or neither.

8. Discuss the symmetry of the graph of $f(x) = e^{2x} - e^{-2x}$.

9. For the function $h(x) = \frac{x^3}{x^2+1}$, investigate whether it exhibits any symmetry.

10. Find the inverse function of $f(x) = 2x + 4$.

11. Find the inverse of $g(x) = (x-3)^2$.

12. For the function $h(x) = \log_3(x+1)$, find its inverse and state the domain and range of both functions.