M408C: Problem Set 1

Problem 1

Use the laws of exponents to rewrite and simplify the expressions:

$$8^{4/3}, \quad x(3x^2)^3, \quad \frac{(6y^3)^4}{2y^5}.$$

Problem 2

Describe the domain and range of the following functions

$$\sqrt{x+1}, \quad \frac{x+1}{x+2}, \quad \frac{1+x}{e^{\cos(x)}}.$$

Problem 3

Determine whether the following functions are one-to-one:

$$1 - \sin(x), \quad x^4 - 16, \quad 2x - 3.$$

Problem 4

Find the formula for the inverse of the following functions

$$1 + \sqrt{2 + 3x}, \quad e^{2x-1}, \quad x^2 - x, \quad \text{for } x \geq 2.$$

Problem 5

Find the exact values of each expression:

$$\log_2(32), \quad \ln\left(\frac{1}{e^2}\right), \quad \log_{10}(40) + \log_{10}(2.5).$$