

M408C: Problem Set 7

Problem 1

The radius of a sphere is increasing at a rate of 4 mm/s. How fast is the volume increasing when the diameter is 80 mm.

Problem 2

Find the linearization $L(x)$ of the function at a for

$$f(x) = x^3 - x^2 + 3 \quad a = -2, \quad f(x) = \sin(x) \quad a = \frac{\pi}{6}.$$

Problem 3

Prove the following identities:

$$\sinh(-x) = -\sinh(x), \quad \cosh(-x) = \cosh(x), \quad \cosh(x) + \sinh(x) = e^x.$$

Problem 4

Sketch the graph of f by hand use your sketch to find the absolute and local maximum and minimum values of f .

$$f(x) = \frac{1}{2}(3x - 1) \quad x \leq 3, \quad f(x) = 2 - \frac{1}{3}x \quad x \geq -2.$$

Problem 5

Find the critical points of

$$f(x) = 4 + \frac{1}{3}x - \frac{1}{2}x^2$$