

Worksheet 9

Sections 2.8 and 3.1

Section 2.8

Problem 1. Determine whether the following functions are one-to-one.

(a) $r(t) = t^4 - 1$. (b) $r(t) = t^4 - 1$, $0 \leq t \leq 6$.

Problem 2. Let $f(x) = x^3 - 1$.

(a) Sketch the graph of f . (b) Use the graph of f to sketch the graph of f^{-1} . (c) Find f^{-1} .

Problem 3. Let $g(x) = \sqrt{x+3}$.

(a) Sketch the graph of f . (b) Use the graph of f to sketch the graph of f^{-1} . (c) Find f^{-1} .

Section 3.1

Problem 4. Let $f(x) = 2x^2 + 4x + 3$.

(a) Express f in standard form. (b) Find the vertex of f . (c) Find the x and y -intercepts of f .
(d) Sketch the graph of f . (e) What is the maximum value of f ?

Problem 5. A Norman window has the shape of a rectangle surmounted by a semicircle, as shown in the figure below. A Norman window with a perimeter of 30 feet is to be constructed.

(a) Find the function that models the area of the window.

(b) Find the dimensions of the window that admits the greatest amount of light.



Problem 6. A rancher with 750 feet of fencing wants to enclose a rectangular area and then divide it into four pens with fencing parallel to one side of the rectangle (see the figure below).

(a) Find a function that models the total area of the four pens.

(b) Find the largest possible total area of the four pens.

