Solution for HW 2 (Math 114 Q1)

Sec 1.1
32. The domain is \( \{ t : t \neq 2 \} \). The graph is the line \( y = 2 + t \) with the point \((2, 4)\) removed.

40. The domain is \((−∞, ∞)\).

50. Let \( x, S \) and \( V \) be the edge, surface area and volume of the cube, respectively. Then \( S = 6x^2 \) and \( V = x^3 \). Consequently, \( S = 6\sqrt[3]{V} \).

64. Since \( f(−x) = (−x)^4 - 4(−x)^2 = x^4 - 4x^2 = f(x) \), \( f(x) \) is even.

Sec 1.3
10. The graph of \( y = 1 - x^2 \) can be obtained by reflecting \( y = x^2 \) with respect to the \( x \)-axis and then shifting it upward by 1.

32. \( f \pm g = \sqrt{1+x} \pm \sqrt{1-x} \), \( fg = \sqrt{1-x^2} \) and \( f/g = \sqrt{1+x} \). The domains of \( f \pm g \) and \( fg \) are \([-1, 1]\) and the domain of \( f/g \) is \([-1, 1)\).

40. \( f \circ g = \sqrt{2x^2 + 5}, \ g \circ f = 2x+4 \), \( f \circ f = \sqrt{2\sqrt{2x+3} + 3} \) and \( g \circ g = x^4 + 2x^2 + 2 \). The domains of \( g \circ f \) and \( f \circ f \) are \([-3/2, ∞)\) and the domains of \( f \circ g \) and \( g \circ g \) are \((−∞, ∞)\).

64. If we let \( g(x) = x \) and \( f(x) = x^2 \), then \( h(x) = f(g(x)) = x^2 \) is not odd. So \( h(x) \) is not necessarily odd.

If \( f(x) \) is even, \( h(x) \) is again not necessarily odd (see the above example).

If \( f(x) \) is odd, \( h(−x) = f(g(−x)) = f(−g(x)) = f(−f(g(x))) = −h(x) \). So \( h(x) \) is odd.