1. (8 pts) True or False
   (a) \((f \circ g)(x) = (g \circ f)(x)\)
   (b) \(f(x)g(x) = g(x)f(x)\)
   (c) \(f^{-1}(x) = \frac{1}{f(x)}\)
   (d) \(\frac{x^3(x-1)^2-(x-1)}{(x-1)^2} = \frac{x^4-x^3-1}{x-1}\)

2. (15 pts) You throw a rock up from the top of a cliff. The height of the rock in feet above the ground is given by \(s(t) = -16t^2 + 40t + 56\).
   (a) How high is the cliff?
   (b) How long until the rock hits the ground at the bottom of the cliff?
   (c) What is the average rate of change of the height of the rock from \(t = 0\) to \(t = 2\)?

3. (20 pts) Write the domain of \(r(t) = \frac{t^2-7}{(t-4)\sqrt{t^2+t-6}}\) in interval notation.

4. (20 pts) Consider the following functions.
   \(f(x) = x^2 - 4\)
   \(k(x) = \sqrt{4-x}\)
   Find the functions below.
   (a) \((f \circ k)(x)\). Write the domain of this function in interval notation.
   (b) \((f \circ k)(5)\)
   (c) \(\left(\frac{f}{k}\right)(0)\)
   (d) \(\frac{f(x+h) - f(x)}{h}\)

5. (15 pts) Sketch the following: \(2x^2 + 2y^2 - 4x + 12y = -12\).
6. (22 pts) A graph of $g(x)$ appears below.

![Figure 1: $g(x)$](image)

(a) Write the domain of $g(x)$ in interval notation.
(b) Write the range of $g(x)$ in interval notation.
(c) On which intervals is $g(x)$ increasing?
(d) On which intervals is $g(x)$ decreasing?
(e) Does the inverse of $g(x)$ exist? Why or why not?
(f) What is $g(g(3))$?
(g) Which of the following is the graph of $-g(x + 2)$?

![Figure 2: $a$](image)

![Figure 3: $b$](image)

![Figure 4: $c$](image)