GROUP WORK 1, SECTION 2.5

Exploring Continuity

1. Are there values of c and m that make $h(x) = \begin{cases} cx^2 & \text{if } x < 1 \\ 4 & \text{if } x = 1 \\ -x^3 + mx & \text{if } x > 1 \end{cases}$ continuous at $x = 1$? Find c and m, or explain why they do not exist.

2. Recall the function $f(x) = \begin{cases} 0 & \text{if } x \text{ is rational} \\ x^2 & \text{if } x \text{ is irrational} \end{cases}$

(a) Do you believe that $f(x)$ is continuous at $x = 0$? Why or why not?

(b) What is $f(0)$?

(c) What is $\lim_{x \to 0} f(x)$?

(d) Use parts (b) and (c) either to revise your answer to part (a), or to prove that your answer is correct.