Name _

- You have 20 minutes
- 1. (a) (3 points) Let $f(x) = x^3 + x + 3$. Use Newton's method with initial approximation $x_0 = -1$ to find x_1 , the next approximation to the root of the equation f(x) = 0. Please write your answer as a **fraction** and put a box around it.

(b) (2 points) The graph of a function h(x) is shown below, along with its tangent line at the point x = 7/4. The roots of h(x) are $x \approx -0.4142$, x = 1, and $x \approx 2.4142$. If I use Newton's method with initial guess $x_0 = 7/4$ to approximate a root of h(x), which root will I find? (Circle the correct answer)



2. (a) (2 points) State the Mean Value Theorem

(b) (3 points) Let $f(x) = x^3 - 3x + 2$. Verify that f(x) satisfies the hypotheses of the Mean Value Theorem on the interval [-3, 3]. Then find all numbers c that satisfy the conclusion of the Mean Value Theorem. Please put a box around your answer.