Short answer questions — you must show your work

1. **2 marks** An investment of $15,000 compounded semi-annually with nominal interest rate of 3% gained $2,000. What was the duration of the investment?

   Answer:

2. **2 marks** Evaluate

   \[ \lim_{{x \to 3}} \frac{2x^2 - 5x - 3}{x^2 - 7x + 12} \]

   Answer:

3. **2 marks** Find the points of discontinuity of \( f(x) \). For each point of discontinuity explain why the function is not continuous there. The function \( f(x) \) is given by the graph.
Long answer question — you must show your work

4. [4 marks] Little Jonny is selling lemonade on Wesbrook Mall in summer. He is selling a cup for $1 and sells 100 cups a week. One week he tried to raise the price by 10 cents and he sold 20 cups less that week.

   (a) Find the demand function linking \( p \) and \( q \).

   Answer: 

   

   (b) What is the price Jimmy needs to set for a cup of lemonade in order to maximize his revenue?

   Answer: 