Assignment 3

The due date for submitting this assignment has passed.

Due on 2021-02-10, 23:59:00

As per your records you have not submitted this assignment.

1. Let \( f(x) = |x| \). \( f(x) \) is differentiable functions such that \( f'(c) = f'(c), V_a \in [a, b] \). Then which of the following is true:

   a) \( f(x) = x \) for \( x \in [a, b] \).
   b) \( f(x) = x \) for \( x \in [a, b] \) for some \( c \) in \( R \).
   c) \( f(x) = x \) for \( x \in [a, b] \) for some \( c \) in \( R \).
   d) The answer is incorrect.

   Accepted Answer:
   c) \( f(x) = x \) for \( x \in [a, b] \) for some \( c \) in \( R \).

   1 point

   The function \( f(x) = x^2 - 2x + 5 \) has its maximum value at the point \( x = 1 \). The value of \( a \) is

   a) 0
   b) 1
   c) 2
   d) 3

   No, the answer is incorrect.

   Accepted Answer:
   c) 2

   1 point

2. If \( f: [a, b] \to R \) is continuous on \( [a, b] \) and differentiable on \( (a, b) \) with \( f'(c) = 0 \), then which of the following is true?

   a) \( f(x) \) is not differentiable at \( c \).
   b) \( f(x) \) is differentiable at \( c \).
   c) \( f(x) \) has a local maximum at \( c \).
   d) \( f(x) \) has a local minimum at \( c \).

   Accepted Answer:
   d) \( f(x) \) has a local minimum at \( c \).

   1 point

3. A function \( f(x) = \frac{1}{x} \) is said to be in \( L^1(\mathbb{R}) \) if there exists \( C > 0 \) such that \( |f(x)| \cdot |x| \leq C \) for \( x \neq 0 \). Which of the following functions does not belong to \( L^1(\mathbb{R}) \)?

   a) \( f(x) = 1 \)
   b) \( f(x) = x^2 \)
   c) \( f(x) = \frac{1}{x} \)
   d) \( f(x) = \frac{1}{|x|} \)

   Accepted Answer:
   d) \( f(x) = \frac{1}{|x|} \)

   1 point

4. Let \( f: [0, 1] \to \mathbb{R} \) be a differentiable function such that \( f'(x) = 4 \). Then \( f(x) \) is increasing on

   a) \( \mathbb{R} \)
   b) \((0, 1)\)
   c) \([-2, 1]\)
   d) \((-\infty, x) \cup (x, \infty)\)

   No, the answer is incorrect.

   Accepted Answer:
   b) \((0, 1)\)

   1 point

5. The absolute maximum value of the function \( f(x) = \frac{1}{x^2} \) on \( [1, 3] \) is

   a) 0
   b) 1
   c) 2
   d) 3

   No, the answer is incorrect.

   Accepted Answer:
   b) 1

   1 point

6. The point of inflection of the function \( f(x) = x^2 \) in \((-2, 3)\) is

   a) \(-1\)
   b) \(0\)
   c) \(1\)
   d) \(2\)

   No, the answer is incorrect.

   Accepted Answer:
   c) \(1\)

   1 point

7. Let \( f(x) = \frac{1}{x^2} \). Then which of the following is correct?

   a) \( f(x) \) is a horizontal asymptote.
   b) \( f(x) \) is a vertical asymptote.
   c) \( f(x) \) is a horizontal asymptote.
   d) \( f(x) \) is a vertical asymptote.

   Accepted Answer:
   c) \( f(x) \) is a horizontal asymptote.

   1 point

8. Which of the following is a valid asymptote for the curve \( y = \frac{1}{x^2} \) for \( x > 30 \)?

   a) \( x = 0\)
   b) \( y = 0\)
   c) \( x = 1\)
   d) \( y = 30\)

   No, the answer is incorrect.

   Accepted Answer:
   b) \( y = 0\)

   1 point