Assignment 3

The due date for submitting this assignment has passed.

Due on 2021-02-10, 23:59 IST.

As per our records you have not submitted this assignment.

1) Let $f, g : [a, b] \to \mathbb{R}$ be differentiable functions such that $f'(x) = g'(x), \forall x \in [a, b]$. Then which of the following is true: *1 point*

- $f(x) = g(x), \forall x \in [a, b]$.
- $f(x) = g(x) + c, \forall x \in [a, b]$ for some $c \in \mathbb{R}$.
- $f(x) = g(x) + cx, \forall x \in [a, b]$ for some $c \in \mathbb{R}$.
- There exists a point $c \in [a, b]$ such that $f(c) = g(c)$.

No, the answer is incorrect.
Score: 0

Accepted Answers:
$f(x) = g(x) + c, \forall x \in [a, b]$ for some $c \in \mathbb{R}$.

2) The function $f(x) = x^5 - 27x^2 + 7ax + 5$ attains its maximum value at the point $x = 1$. The the value of a is *1 point*

- 0
- 3
- 5
- 7

No, the answer is incorrect.
Score: 0

Accepted Answers:
7

3) If $f, g : [a, b] \to \mathbb{R}$ are continuous on $[a, b]$ and differentiable on (a, b) with $f(a) = f(b) = 0$, then which of the following is true? *1 point*

(Hint: Apply Rolle's theorem on $f(x)e^{g(x)}$.)

- There exists a point $c \in [a, b]$ such that $f(c) + f'(c)g'(c) = 0$.
- There exists a point $c \in [a, b]$ such that $f'(c) + f(c)g'(c) = 0$.
- There exists a point $c \in [a, b]$ such that $g(c) + f(c)f'(c) = 0$.
- There exists a point $c \in [a, b]$ such that $f(c) + f'(c)g(c) = 0$.

No, the answer is incorrect.
Score: 0

Accepted Answers:
There exists a point $c \in [a, b]$ such that $f'(c) + f(c)g'(c) = 0$.

4) A function $f : [0, 1] \to \mathbb{R}$ is said to be in $Lip[0, 1]$ if there exists $C > 0$ such that $|f(x) - f(y)| \leq C|x - y|, \forall x, y \in [0, 1]$. Which of the following function does not belong to $Lip[0, 1]$? *1 point*

- $|x|$.
- $\sin x$.
- e^x.
- $\sqrt{x}$.

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\sqrt{x}$.

5) Let $f : \mathbb{R} \to \mathbb{R}$ be a differentiable function such that $f'(x) = 4e^x(4x^2 - 1)(x^2 - x - 6)$, then f is increasing on *1 point*

- $(-\infty, -2) \cup (-\frac{1}{2}, \frac{1}{2}) \cup (3, \infty)$.
- $(-2, -\frac{1}{2}) \cup (\frac{1}{2}, 3)$.
- $(-2, -\frac{1}{2}) \cup (3, \infty)$.
- $(-2, 0) \cup (-\frac{1}{2}, \frac{1}{2}) \cup (3, \infty)$.

No, the answer is incorrect.
Score: 0

Accepted Answers:
$(-\infty, -2) \cup (-\frac{1}{2}, \frac{1}{2}) \cup (3, \infty)$.

6) The absolute maximum value of the function $f(x) = 2x^3 - 9x^2 + 12x - 6$ in $[0, 3]$ is *1 point*

- 1.
- 2.
- 3.
- 4.

No, the answer is incorrect.
Score: 0

Accepted Answers:
3.

7) The function $f(x) = 5x^7 - 21x^6 + 21x^5 + 10x + 21$ is concave down in which of the following domain: *1 point*

- $(0, 1)$.
- $(1, 2)$.
- $(2, 3)$.
- $(0, 2)$.

No, the answer is incorrect.
Score: 0

Accepted Answers:
$(1, 2)$.

8) The point of inflection of the function $e^x \cos x$ in $[-2, 2]$ is *1 point*

- -1.
- 1.
- 0.
- No point of inflection.

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.

9) Let $f(x) = \frac{x^{\frac{3}{2}} - 1}{\sqrt{x^4 + 1}}$. Then which of the following is correct? *0 points*

- $x = 1$ is a vertical asymptote.
- $x = 0$ is a vertical asymptote.
- $x = 1$ is a horizontal asymptote.
- $x = 0$ is a horizontal asymptote.

No, the answer is incorrect.
Score: 0

Accepted Answers:
$x = 0$ is a horizontal asymptote.

10) Which of the following is a slant asymptote for the curve $y = \frac{x^3+1}{x^2-9}, x > 3$? *1 point*

- $y = x$.
- $y = -x$.
- $y = x + 1$.
- $y = x - 1$.

No, the answer is incorrect.
Score: 0

Accepted Answers:
$y = x$.