Assignment 2

The due date for submitting this assignment has passed.

Due on 2021-02-07, 23:59 IST.

As per our records you have not submitted this assignment.

1) Let $f(x) = \begin{cases} x^3 - 2x & x > 1 \\ -1 & x = 1 \\ \tan(\frac{\pi x}{4}) & -1 < x < 1 \\ \frac{1}{x} & x \leq -1 \end{cases}$. Then points of continuity of f are *1 point*

- $[1, \infty)$.
- $\mathbb{R}$.
- $\mathbb{R} \setminus \{1\}$.
- $\mathbb{R} \setminus \{-1\}$.

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\mathbb{R} \setminus \{1\}$.

2) The set of discontinuities of $f(x) = \begin{cases} \frac{3x-2}{\sin(\pi x)} & x \notin \mathbb{Z} \\ 0 & x \in \mathbb{Z} \end{cases}$ are *1 point*

- $\{\frac{2}{3}\}$.
- $\{0, \frac{2}{3}\}$.
- $\mathbb{Z} \cup \{\frac{2}{3}\}$.
- $\mathbb{Z}$.

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\mathbb{Z}$.

3) Which of the following are correct: *2 points*

- $f : [0, 1] \to \mathbb{R}$ be continuous such that $f(0) \neq f(1)$, then range of f contains an interval.
- If $f : [0, 1] \to [0, 1]$ is continuous then there exists $x \in [0, 1]$ such that $f(x) = x$.
- $x^{2021} - 2020x^{20} + 202 = 0$ has no real roots.
- $\frac{3x^3+5x^2-10x+1}{2x-5} = 0$ has atleast one solution in $(0, 1)$.

No, the answer is incorrect.
Score: 0
Accepted Answers:
$f : [0, 1] \to \mathbb{R}$ be continuous such that $f(0) \neq f(1)$, then range of f contains an interval.
If $f : [0, 1] \to [0, 1]$ is continuous then there exists $x \in [0, 1]$ such that $f(x) = x$.
$\frac{3x^3+5x^2-10x+1}{2x-5} = 0$ has atleast one solution in $(0, 1)$.

4) Let $f(x) = ln\left(\sqrt{x} + \frac{1}{\sqrt{x}}\right), x > 0$, then $f'(x)$ is *1 point*

- $\frac{1}{\sqrt{x}+\frac{1}{\sqrt{x}}}$.
- $\frac{x-1}{2x(x+1)}$.
- $\frac{x-1}{2x^{\frac{3}{2}}}$.
- $\frac{x-1}{2(x+1)}$.

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\frac{x-1}{2x(x+1)}$.

5) Let $f(x) = e^{\sin x^2}, x \in \mathbb{R}$, then $f'(x)$ is *1 point*

- $e^{\sin x^2} \cos x^2$.
- $e^{\cos x^2} \cos x^2$.
- $2xe^{\cos x^2} \cos x^2$.
- $2xe^{\sin x^2} \cos x^2$.

No, the answer is incorrect.
Score: 0
Accepted Answers:
$2xe^{\sin x^2} \cos x^2$.

6) The volume of a cube is increasing at the rate of $12cm^3s^{-1}$. The rate of increase of the surface area of the cube when the side of the cube is 16 cm, is *1 point*

- $1cm^2s^{-1}$.
- $2cm^2s^{-1}$.
- $3cm^2s^{-1}$.
- $4cm^2s^{-1}$.

No, the answer is incorrect.
Score: 0
Accepted Answers:
$3cm^2s^{-1}$.

7) The equation of a curve is $x^3 + y^3 = 9xy$, then $\frac{dy}{dx}$ is *1 point*

- $\frac{x^2-3y}{3x-y^2}$.
- $\frac{y^2-3x}{3y-x^2}$.
- $3(x^2 + y^2)$.
- $\frac{x^2+y^2}{3x}$.

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\frac{x^2-3y}{3x-y^2}$.

8) Let $y = ln(\sin x)$, then *1 point*

- $\frac{dy}{dx} = \frac{1}{\sin x}$.
- $\frac{dy}{dx} = ln(\sin x) \cos x$.
- $\frac{d^2y}{dx^2} = -\frac{1}{\sin^2 x}$.
- $\frac{d^2y}{dx^2} = -\sec^2 x$.

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\frac{d^2y}{dx^2} = -\frac{1}{\sin^2 x}$.

9) Let $y = mx + c$ be the tangent to the curve $y = x^4 - x^3$ at the point $(1, 0)$. Then which of the following is true? *1 point*

- $c = 0$.
- $(1, 0)$ does not lie on the tangent.
- $m = -1$.
- $y = x + 1$ is parallel to the tangent.

No, the answer is incorrect.
Score: 0
Accepted Answers:
$y = x + 1$ is parallel to the tangent.