(A)

King Fahd University of Petroleum and Minerals

Department of Mathematics

Math - 106 Semester - 151 Quiz # I

Name: **S. No.:** **ID:**

Maximum Marks: 05 Section: Time Allowed: 10 Minutes

Instructions: *There are Five multiple choice questions. Each question carry equal mark. Put the right sign ($\surd$) against the correct answer. Give the answer of all questions.*

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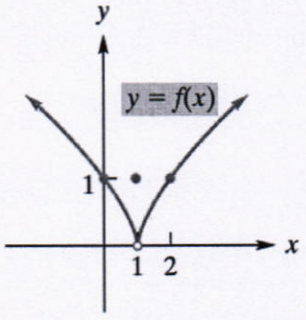
1. The graph of the function $y = f(x)$ is given:



Which of the following is true?

(a) $\lim_{x\to 1} f(x) =$ does not exist and $\lim_{x\to 0} f(x) = 1$

(b) $\lim_{x\to 1} f(x) = 1$ and $\lim_{x\to 2} f(x) = 0$

(c) $\lim_{x\to 1^-} f(x) = 0$ and $\lim_{x\to 1^+} f(x) = 0$

(d) $\lim_{x\to 1^-} f(x) = 1$ and $\lim_{x\to 1^+} f(x) = 1$

2. $\lim_{x\to\infty} \dfrac{3x - 2x^3}{5x^3 - 8x + 1}$ is

$$\lim_{x\to\infty} \frac{3x-2x^3}{5x^3-8x+1} = \lim_{x\to\infty} \frac{-2x^3}{5x^3} = -\frac{2}{5}$$

(a) $\frac{3}{5}$

(b) $\frac{-2}{5}$

(c) $\frac{-2}{1}$

(d) $\frac{5}{2}$

3. The function $f(x) = \begin{cases} \frac{1}{x}, & \text{if } x \neq 0 \\ 0, & \text{if } x = 0 \end{cases}$ is

$\lim_{x\to 0} f(x)$ does not exist-

as $\lim_{x\to 0^-} \frac{1}{x} = -\infty$

and $\lim_{x\to 0^+} \frac{1}{x} = +\infty$

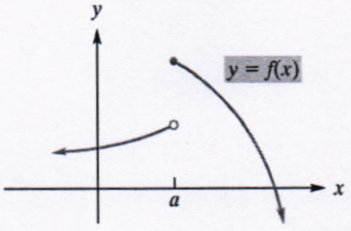
(a) continuous only at $x = 0$

(b) continuous at $x = 0$, but discontinuous at $x = 1$

(c) discontinuous everywhere

(d) discontinuous at $x = 0$

4. The graph of the function $y = f(x)$ is given below:



Which of the following statement is correct?

If a function f is not continuous at a point $x=a$, then it is not differentiable at $x=a$.

(a) f is continuous at a, but not differentiable at a

(b) f is not continuous at a, but differentiable at a

(c) f is continuous as well as differentiable at a

(d) f is neither continuous nor differentiable at a

5. If $f(x) = \dfrac{7x^3 + x}{6\sqrt{x}}$, then

$f(x) = \frac{1}{6}\left[7x^{3-\frac{1}{2}} + x^{1-\frac{1}{2}}\right] = \frac{1}{6}\left[7x^{5/2} + x^{1/2}\right]$

$f'(x) = \frac{1}{6}\left[7 \times \frac{5}{2}\, x^{3/2} + \frac{1}{2}\, x^{-1/2}\right]$

$= \frac{1}{12}\sqrt{x}\left[35x + \frac{1}{x}\right]$

(a) $f'(x) = \dfrac{21x^2 + 1}{3x^{-1/2}}$

(b) $f'(x) = \dfrac{21x^2}{6x^{3/2}}$

(c) $f'(x) = \dfrac{1}{12}\sqrt{x}\left(35x + \frac{1}{\sqrt{x}}\right)$

(d) $f'(x) = \dfrac{1}{12}\sqrt{x}\left(35x + \frac{1}{x}\right)$

For Rough Work