SUCCESS KEY TEST SERIES

Work Sheet

Std: 11th Science | **Subject: Mathematics & Statistics** | **Time: 1Hrs**

Date :

8.Continuity

Max Marks: 40

Q.1 Select and write the most appropriate answers from given alternatives: **12**

1) A function f(x) is said to be continuous from the left at x = a if

(a) $\lim_{x\to a^+} f(x) = f(a)$ (b) $\lim_{x\to a^-} f(x) = f(a)$

(c) $\lim_{x\to 0} f(x) = f(a)$ (d) None of the above

2) If $f(x) = \dfrac{1-\sqrt{2}\sin x}{\pi - 4x}$, for $x \neq \dfrac{\pi}{2}$ is continuous at $x = \dfrac{\pi}{4}$, then $f\left(\dfrac{\pi}{4}\right) =$

(a) $\dfrac{1}{\sqrt{2}}$ (b) $-\dfrac{1}{\sqrt{2}}$ (c) $-\dfrac{1}{4}$ (d) $\dfrac{1}{4}$

3) If functions f(x) and g(x) are continuous everywhere and f(1) = 2, f(3) = -4, f(4) = 8, g(0) = 4, g(3) = -6 and g(7) = 0 then lim (f + g) (x) as x approaches 3 is equal to

(a) -10 (b) -11 (c) 0 (d) 1

4) Consider the function $f(x) = \begin{cases} x^2 - x - 5 & for\ -4 \leq x < -2 \\ x^3 - 4x - 3 & for\ -2 \leq x \leq 1 \end{cases}$

(a) Left hand limit at x = -2 is 1
(b) Right hand limit at x = 2 is -3
(c) Both (a) and (b)
(d) None of the above

5) The function f(x) = [x] is
(a) Continuous at x = 1
(b) Continuous at x = 0
(c) Continuous at x = -1
(d) Discontinuous at any integer value

6) For the function $g(x) = \begin{cases} 2x & x < 6 \\ x - 1 & x \geq 6 \end{cases}$

(a) g(x) is continuous everywhere
(b) g(x) is continuous at x = 6
(c) g(x) is undefined at x = 6
(d) g(x) is not continuous at x = 6

Q.2 Solve the following: **3**

1) Examine the continuity of
$f(x) = x^3 + 2x^2 - x - 2$ at $x = -2$

2) If $f(x) = \begin{cases} 2, & 0 \leq x < 1 \\ c - 2x, & 1 \leq x \leq 2 \end{cases}$ is continous at x = 1, the c = ?

3) If $f(x) = \begin{cases} 1 & , \text{if } x \leq 3 \\ ax + b & , \text{if } 3 < x < 5 \\ 7 & , \text{if } 5 \leq x \end{cases}$ is continous, then find the value of a and b?

Q.3 Answer the following: **10**

1) Identify discontinous if any for the following functions as either a jump or a removable discontinuity on their respective domains.

$f(x) = x^2 + x - 3$, for $x \in [-5, -2)$

$= x^2 - 5$, for $x \in (-2, 5]$

2) Identify discontinuities if any for the following functions as either a jump or a removable discontinuity on their respective domains.

$F(x) = x^2 + 5x + 1$, for $0 \le x \le 3$

$= x^3 + x + 5$, for $3 < x \le 6$

3) Examine the continuity of

$$f(x) = \frac{x^2 - 9}{x - 3}, \text{ for } x \neq 3$$

$$= 8 \qquad \text{for } x = 3$$

4) Discuss the continuity of f on its domain, where

If $f(x) = |x + 1|$, for $-3 \le x \le 2$

$= |x - 5|$, for $2 < x \le 7$.

5) Suppose $f(x) = px + 3$ for $a \le x \le b$

$= 5x^2 - q$ for $b < x \le c$

Find the condition on p, q, so that f(x) is continuous on [a, c], by filling in the boxes

$f(b) = \square$

$\lim_{x \to b} f(x) = \square$

$\therefore pb + 3 \; \square \; - q$

$\therefore p = \frac{\square}{b}$ is the required condition

Q.4 Solve the following: **15**

1) Show that following functions have continuous extension to the point where f(x) is not defined. Also find the extension

$$f(x) = \frac{x^2 - 1}{x^3 + 1} \text{ for } x \neq -1$$

2) Discuss the continuity of the following functions at the points indicated against them.

$$f(x) = \frac{e^{1/x} - 1}{e^{1/x} + 1}, \text{ for } x \neq 0$$

$$= 1 \qquad , \text{for } x = 0, \text{ at } x = 0$$

3) Examine whether the function is continuous at the points indicated against them.

$$f(x) = \frac{x^2 + 18x - 19}{x - 1}, \text{ for } x \neq 1$$

$$= 20 \qquad \text{for } x = 1, \; x = 1$$

4) If $f(x) = \frac{\sin 2x}{5x} - a$, for $x > 0$,

$= 4$ for $x = 0$

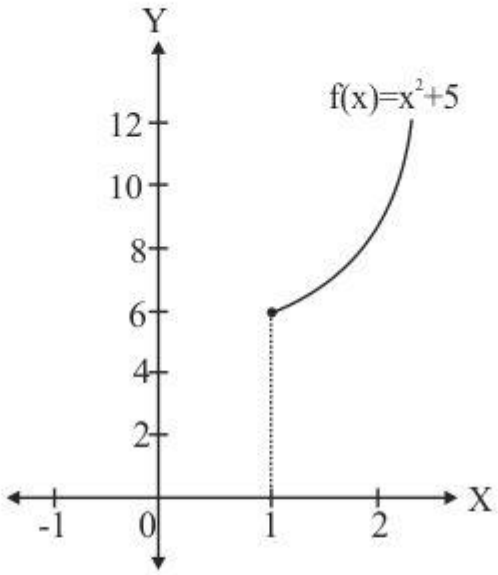
$= x^2 + b - 3$, for $x < 0$

is continuous at $x = 0$, find a and b.

5) Let $f(x) = ax + b$ (where a and b are unknown)

$= x^2 + 5$ for $x \geq 1$

Find the values of a and b, so that f(x) is continuous at x = 1.



-------- All the Best --------