

## Topic: “Continuity”

1. If a function ‘f’ is continuous at  $x = 0$  where ,

Page | 1  $f(x) = \frac{\sin 3x}{5x} + a$ , for  $x < 0$

$$= x + 4 - b, \text{ for } x \geq 0 \text{ Find the value of } a + b .$$

2. If  $f(x) = \frac{\sqrt{3 - \tan x}}{\pi - 3x}$ , When  $x \neq \frac{\pi}{3}$

$$= \frac{4}{3} \quad \text{When } x = \frac{\pi}{3}$$

Discuss the continuity of the function at  $x = \frac{\pi}{3}$ .

3. Find the value of ‘k’ if the function ,

$$f(x) = \frac{1 - \cos kx}{x \cdot \sin x}, \text{ for } x \neq 0$$
$$= 2 \quad \text{for } x = 0, \text{ is continuous at } x = 0 .$$

4. Test the continuity of the function  $f(x)$  at  $x = 0$  , where

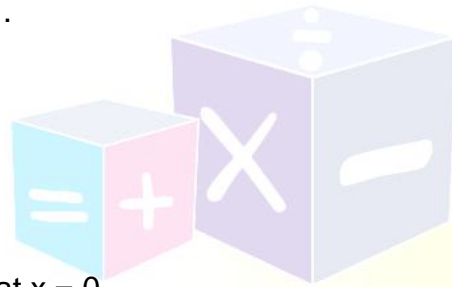
$$f(x) = x^2 \sin\left(\frac{1}{x}\right), \quad \text{for } x \neq 0$$
$$= 1, \quad \text{for } x = 0$$

5. Examine the continuity of  $f(x)$  at  $x = 3$  , If

$$f(x) = x^2 + 1, \quad 0 \leq x < 3 .$$
$$= 3x + 1, \quad 3 \leq x \leq 6 .$$

6. Find k , if f is continuous at  $x = 0$  where ,

$$f(x) = \frac{16^x - 2^x}{k^2 - 1} \quad \text{When } x \neq 0 .$$
$$= 3 \quad \text{When } x = 0 .$$



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7. If  $f$  is continuous at  $x = 0$  where .

$$f(x) = \frac{\sin 5x}{4x} + a, \quad \text{for } x > 0,$$

$$= x + 5 - 2ab, \quad \text{for } x < 0,$$

$$= 2, \quad \text{for } x = 0, \text{ Find } a \text{ and } b.$$

8. Examination the continuity of the function,

$$f(x) = \sin x - \cos x, \quad \text{for } x \neq 0.$$

$$= -1, \quad \text{for } x = 0, \text{ At the point } x = 0.$$

9. Examine the continuity of the following function at given point.

$$f(x) = \frac{\log x - \log 8}{x - 8}, \quad \text{for } x \neq 8$$

$$= 8, \quad \text{for } x = 8, \text{ at } x = 8.$$

10. If  $f(x) = \left[ \tan\left(\frac{\pi}{4} + x\right) \right]^{\frac{1}{x}}$ , for  $x \neq 0$

$$= k, \quad \text{for } x = 0, \text{ is continuous at } x = 0, \text{ find } k.$$

11. Discuss the continuity of the following function at  $x = 1$ .

$$f(x) = \frac{1}{1-x} - \frac{3}{1-x^3} + \frac{7}{4}, \quad \text{When } x < 1$$

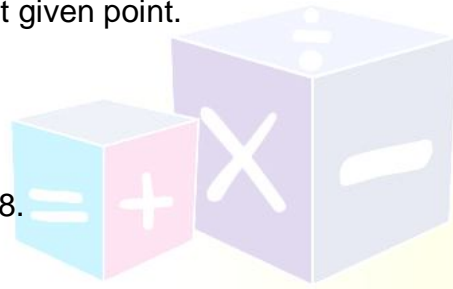
$$= \frac{3}{4}, \quad \text{When } x = 1$$

$$= \frac{\log x}{x-1} - \frac{1}{4}, \quad \text{When } x > 1.$$

12. Discuss the continuity of the function  $f(x)$  on its domain ,Where..

$$f(x) = x^2 + 4, \quad \text{for } 0 \leq x \leq 2$$

$$= 3x + 2, \quad \text{for } 2 < x < 4$$



$$= x^2 + 1, \quad \text{for } 4 \leq x \leq 6.$$

13. Given:  $f(x) = \frac{\log x - \log 3}{x - 3}$ , for  $x \neq 3$ , if  $f(x)$  is continuous at  $x = 3$ , find  $f(3)$ .

Page | 3 14. Find  $k$ , if the function .

$$f(x) = 3x - 4, \quad \text{for } 0 \leq x \leq 2,$$

$$= 2x + k, \quad \text{for } 2 \leq x \leq 4, \text{ is continuous at } x = 2.$$

15. If  $f(x) = \frac{(5^{\sin x} - 1)^2}{x \log(1 + 2x)}$  :

$x \neq 0$  is continuous at  $x = 0$ , then find  $f(0)$

16. A function  $f(x)$  is defined as ,

$$f(x) = x + a, \quad x < 0.$$

$$= x, \quad 0 \leq x < 1.$$

$$= b - x, \quad x \geq 1; \text{ is continuous in its domain, Find } a + b.$$

17. Examine continuity of the function  $f(x)$  at  $x = 0$ . Where,

$$f(x) = \frac{10^x + 7^x - 14^x - 5^x}{1 - \cos 4x}, \quad \text{for } x \neq 0.$$

$$= \frac{10}{7}, \quad \text{for } x = 0.$$

18. If the function  $f(x)$  is continuous in the interval  $[-2, 2]$ , find the value of  $a$  and  $b$

where,

$$f(x) = -\frac{\sin ax}{x} - 2, \quad \text{for } -2 \leq x < 0$$

$$= 2x + 12 \quad \text{for } 0 \leq x \leq 1$$

$$= 2b\sqrt{x^2 + 3} \quad \text{for } 1 < x \leq 2$$

19. Show that the function defined by  $f(x) = [\cos x]$  is continuous function.

20. find a and b, so that the function  $f(x)$  defined by ,

$$f(x) = -2\sin x, \quad \text{for } -\pi \leq x \leq -\frac{\pi}{2}$$

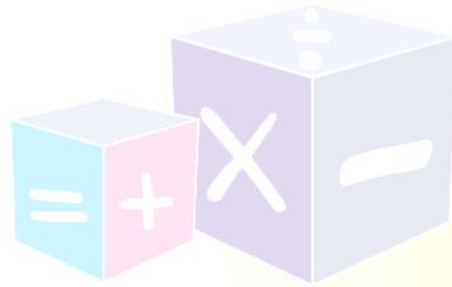
$$= a\sin x + b, \quad \text{for } -\frac{\pi}{2} < x < \frac{\pi}{2}$$

$$= \cos x, \quad \text{for } \frac{\pi}{2} \leq x \leq \pi$$

Is continuous on  $(-\pi, \pi)$ .

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