

Assignment : Continuity of Picewise function

1. Consider the following piece-wise defined function:

$$f(x) = \begin{cases} \sqrt{3x-2} & \text{if } x \leq 1 \\ x^2 + 1 & \text{if } x > 1 \end{cases}$$

Analyze the continuity of this function at $x = 1$.

2. Consider the following piece-wise defined function:

$$f(x) = \begin{cases} \frac{3}{x+2} - 1 & \text{if } x < 1 \\ 1 & \text{if } x = 1 \\ \sqrt{x} & \text{if } x > 1 \end{cases}$$

Analyze the continuity of this function at $x = 1$.

3. Consider the following piece-wise defined function:

$$f(x) = \begin{cases} \sqrt{-2x^2 + 3x + 8} & \text{if } x \leq 1 \\ \frac{-9x}{x+2} + 6 & \text{if } x > 1 \end{cases}$$

Analyze the continuity of this function at $x = 1$.

4. Consider the following piece-wise defined function:

$$f(x) = \begin{cases} \frac{-18x}{x+3} + 10 & \text{if } x \leq 3 \\ \frac{x}{x-2} - 1 & \text{if } x > 3 \end{cases}$$

Analyze the continuity of this function at $x = 3$.

5. Consider the following piece-wise defined function:

$$f(x) = \begin{cases} \sqrt{x^2 - 2x - 15} & \text{if } x < -3 \\ 0 & \text{if } x = -3 \\ x^2 - 10 & \text{if } x > -3 \end{cases}$$

Analyze the continuity of this function at $x = -3$.

6. Consider the following piece-wise defined function:

$$f(x) = \begin{cases} \frac{-6x}{x} + 7 & \text{if } x < 2 \\ 2 & \text{if } x = 2 \\ -3x + 8 & \text{if } x > 2 \end{cases}$$

Analyze the continuity of this function at $x = 2$.

7. Consider the following piece-wise defined function:

$$f(x) = \begin{cases} x^2 - x - 8 & \text{if } x < -2 \\ -2x^2 - x + 4 & \text{if } x \geq -2 \end{cases}$$

Analyze the continuity of this function at $x = -2$.

8. Consider the following piece-wise defined function:

$$f(x) = \begin{cases} 2x & \text{if } x < 1 \\ \sqrt{x^2 + 3} & \text{if } x \geq 1 \end{cases}$$

Analyze the continuity of this function at $x = 1$.

9. Consider the following piece-wise defined function:

$$f(x) = \begin{cases} -2x^2 + 2x + 13 & \text{if } x \leq 3 \\ \sqrt{2x^2 - 3x - 9} & \text{if } x > 3 \end{cases}$$

Analyze the continuity of this function at $x = 3$.

10. Consider the following piece-wise defined function:

$$f(x) = \begin{cases} \frac{6}{x-3} + 3 & \text{if } x \leq 1 \\ -3x^2 - 2x + 4 & \text{if } x > 1 \end{cases}$$

Analyze the continuity of this function at $x = 1$.

Answers: 1. discontinuous 2. discontinuous 3. continuous 4. discontinuous 5. discontinuous 6. discontinuous 7. continuous 8. continuous 9. discontinuous 10. discontinuous