UNIT 1

STATION IV – CONTINUITY

2.0 Students demonstrate knowledge of both the formal definition and the graphical interpretation of continuity of a function.

LEVEL 1

1. Complete the following sentence.

   If a point to be continuous, then its _____ exists AND its

   _____ is equal to its _____.

LEVEL 2

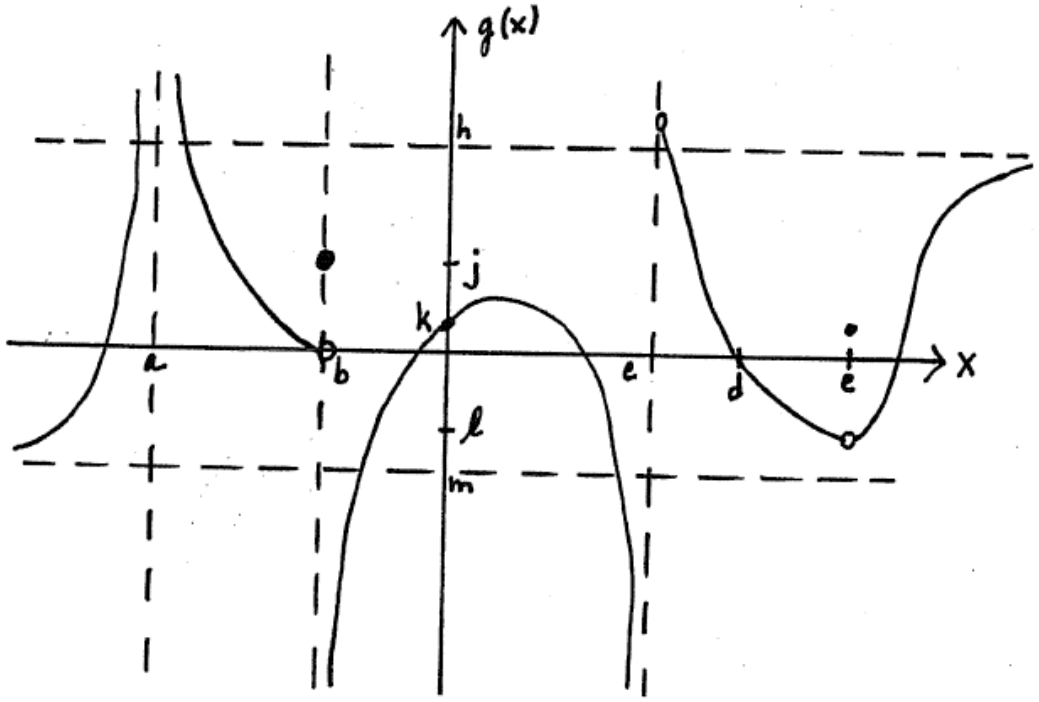
Analyze the continuity of each function at the given value.

1) $\lim_{x\to -1} f(x),\ f(x) = \begin{cases} -x-2, & x < -1 \\ -1, & x \geq -1 \end{cases}$

2) $\lim_{x\to -1} f(x),\ f(x) = \begin{cases} x^2 - 2x + 1, & x \leq -1 \\ 4, & x > -1 \end{cases}$

3) $\lim_{x\to 2} f(x),\ f(x) = \begin{cases} \frac{x}{2} + 1, & x < 2 \\ -\frac{x}{2} + 3, & x \geq 2 \end{cases}$

4) $\lim_{x\to 0} f(x),\ f(x) = \begin{cases} x + 5, & x \leq 0 \\ 2x + 7, & x > 0 \end{cases}$



5. Using the graph above, write the intervals that the function is continuous.

LEVEL 3

[27]. Suppose that $f(x) = \begin{cases} A + x & \text{if } x < 2 \\ 1 + x^2 & \text{if } x \geq 2 \end{cases}$

Find a value of A such that the function $f(x)$ is continuous at the point $x = 2$.

[29]. Consider the function $f(x) = \begin{cases} 2x^2 + 3 & \text{if } x \leq 3 \\ 3x + B & \text{if } x > 3 \end{cases}$.

Find a value of B such that $f(x)$ is continuous at $x = 3$.

[31]. Which of the following is true for the function $f(x)$ given by

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

f is continuous everywhere

f is continuous everywhere except at $x = -1$ and $x = 1$

f is continuous everywhere except at $x = -1$

f is continuous everywhere except at $x = 1$

None of the above