

Lt 1 Continuity

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Task 1)

Classify the type of discontinuity at $x = -5$ for $h(x)$. explain by using limits.

$$h(x) = \begin{cases} 7x + 32 & x < -5 = 7(-5) + 32 = 3 \\ 4 & x = -5 = 4 \\ -4x - 16 & x > -5 = -4(-5) - 16 = +4 \end{cases}$$

This is jump discontinuity because the limit approaching from the left and right do not agree. The function is discontinuous at $x = -5$.

Task 2)

determine value of b to make $g(x)$ continuous at $x = -3$. explain using limits.

$$g(x) = \begin{cases} bx + 1/5 & x \leq -3 \\ -x^2 - 5x - 9 & x > -3 \end{cases}$$

The limit $x = -3$ is continuous when b is set to $16/15$.

$$b(-3) + 1/5 = -(-3)^2 - 5(-3) - 9$$

$$-3b + 1/5 = -9 + 15 - 9$$

$$-3b + 1/5 = -3$$

$$\begin{array}{r} -3b + 1/5 = -3 \\ \underline{-1/5} \quad -1/5 \\ -3b = -3 - 1/5 \end{array}$$

$$\frac{-3b}{-3} = \frac{-3 - 1/5}{-3}$$

$$b = -\frac{16/5}{-3} = \boxed{\frac{16}{15}}$$