

Worksheet 4(Continuity)

1. Determine whether or not the function given in each case is continuous at the given point. Give reasons for your answer.

a. $f(x) = \begin{cases} x^3 + x^2 & x \leq -2 \\ 2x^2 - 4 & x > -2 \end{cases}$ at $x = -2$.

b. $f(x) = \begin{cases} |x^2 - 4| & -2 \leq x \leq 2 \\ 2x - 4 & x > 2 \\ 3x + 4 & x < -2 \end{cases}$ at $x = 2$ and at $x = -2$.

c. $f(x) = \begin{cases} \frac{x^3 - 9x}{x^2 + x - 12} & x > 3 \\ \frac{10}{7} & x = 3 \\ \frac{2x^2}{7} & x < 3 \end{cases}$ at $x = 3$.

d. $f(x) = \begin{cases} x + \frac{1}{x} & x < 0 \\ -x^3 & x \geq 0 \end{cases}$ at $x = 0$.

e. $f(x) = \begin{cases} x + \frac{1}{x} & x < 0 \\ -2 & x = 0 \\ -\frac{1}{x^3} & x > 0 \end{cases}$ at $x = 0$.

2. In each case determine values of a and b so that the function given is continuous.

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a.
$$f(x) = \begin{cases} 3x^3 - 4x^2 + a & x \leq -2 \\ 4x^2 - 1 & x > -2 \end{cases}$$

b.
$$f(x) = \begin{cases} \frac{x^3 + x^2 - ax}{x^2 - 1} & x \leq -2 \\ 2x^2 + 3x - 4 & x > -2 \end{cases}$$