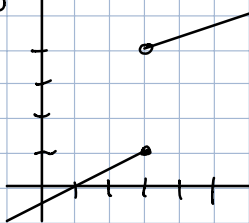


Example: Determine where the following functions are continuous

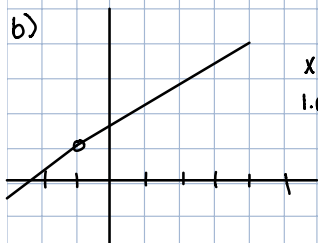
a)



$$x \neq 3$$

$$\text{i.e. } (-\infty, 3) \cup (3, \infty)$$

b)



$$x \neq -1$$

$$\text{i.e. } (-\infty, -1) \cup (-1, \infty)$$

c)

$$f(x) = \begin{cases} 0 & , x < 0 \\ x^2 - 5x & , 0 \leq x \leq 5 \\ 5 & , x > 5 \end{cases}$$

$$\lim_{x \rightarrow 0^-} f(x) = 0 \quad \lim_{x \rightarrow 0^+} f(x) = 0 \quad f(0) = 0 \quad \checkmark$$

$$\lim_{x \rightarrow 5^-} f(x) = 0 \quad \lim_{x \rightarrow 5^+} f(x) = 5 \quad f(5) = 0 \quad \times$$

$$(-\infty, 5) \cup (5, \infty)$$

d)

$$f(x) = \begin{cases} 3x - 5 & , x \neq 1 \\ 2 & , x = 1 \end{cases}$$

$$\lim_{x \rightarrow 1} f(x) = -2 \quad f(1) = 2$$

$$(-\infty, 1) \cup (1, \infty)$$

e)

$$f(x) = \begin{cases} x - 1 & , x < 1 \\ 0 & , 1 \leq x \leq 4 \\ x - 2 & , x > 4 \end{cases}$$

$$\lim_{x \rightarrow 4^-} f(x) = 0 \quad \lim_{x \rightarrow 4^+} f(x) = 2 \quad f(4) = 0$$

$$\lim_{x \rightarrow 1^-} f(x) = 0 \quad \lim_{x \rightarrow 1^+} f(x) = 0 \quad f(1) = 0$$

$$(-\infty, 4) \cup (4, \infty)$$

f)

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

$$\lim_{x \rightarrow 1^-} f(x) = 1 \quad \lim_{x \rightarrow 1^+} f(x) = 1 \quad f(1) = 1$$

$$\lim_{x \rightarrow 2^-} f(x) = 0 \quad \lim_{x \rightarrow 2^+} f(x) = 0 \quad f(2) = 0$$

$$(-\infty, \infty)$$