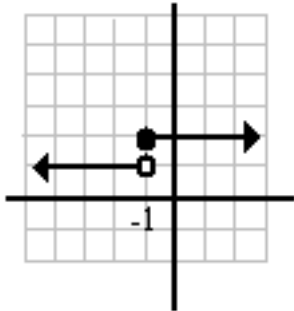


*To live for results would be to sentence myself to continuous frustration. My only sure reward is in my actions and not from them.* – Hugh Prather

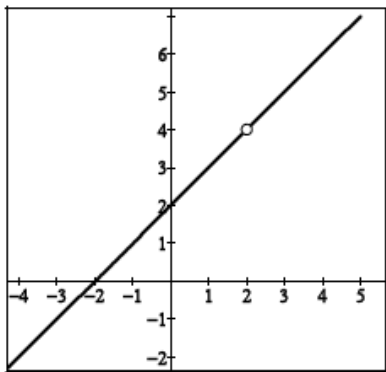
For problems 1-4, use the graph to test the function for continuity at the indicated value of  $x$ .

1.



- 1a) Explain why continuity fails at  $x = -1$ .
- 1b) What kind of discontinuity does  $f(x)$  have?
- 1c) On what open interval(s) is  $f(x)$  continuous?

2.



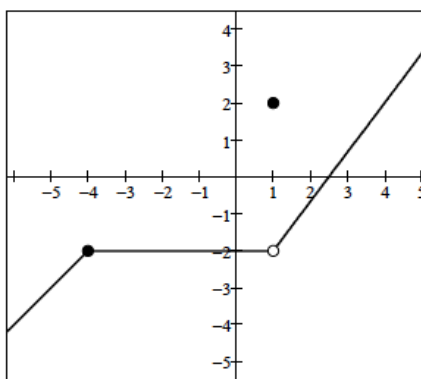
- 2a) Explain why continuity fails at  $x = 2$ .
- 2b) What kind of discontinuity does  $f(x)$  have?
- 2c) On what open interval(s) is  $f(x)$  continuous?
- 2d) How would you remove the discontinuity?

3.



- 3a) Explain why continuity fails at  $x = 3$ .
- 3b) What kind of discontinuity does  $f(x)$  have at  $x = 3$  ?
- 3c) On what open interval(s) is  $f(x)$  continuous?

4.



- 4a) Explain why continuity fails at  $x = 1$ .
- 4b) What kind of discontinuity does  $f(x)$  have?
- 4c) On what open interval(s) is  $f(x)$  continuous?

Determine whether  $f(x)$  is continuous at the given value of  $x$ .

5	$f(x) = \begin{cases} \sin \pi x, & x \leq 2 \\ x^2 + 3x - 9, & x > 2 \end{cases}, \quad x = 2$
6	$f(x) = \begin{cases} -2x + 3, & x < 1 \\ x^2, & x \geq 1 \end{cases}, \quad x = 1$
7	$f(x) = \begin{cases} -2x, & x \leq 2 \\ x^2 - 4x + 1, & x > 2 \end{cases}, \quad x = 2$

Find the constant  $a$ , or the constants  $a$  and  $b$ , such that the function is continuous on the entire number line.

8	$f(x) = \begin{cases} x^3, & x \leq 2 \\ ax^2, & x > 2 \end{cases}$
9	$f(x) = \begin{cases} 4 - x^2, & x < -1 \\ ax^2 - 1, & x \geq -1 \end{cases}$
10	$f(x) = \begin{cases} 2, & x \leq -1 \\ ax + b, & -1 < x < 3 \\ -2, & x \geq 3 \end{cases}$