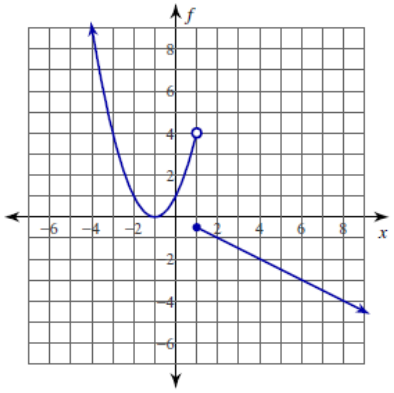
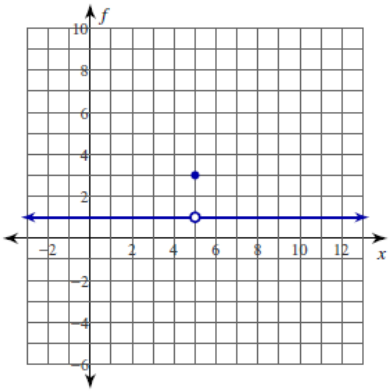
# Continuity Practice … Set 2

**Find the intervals on which each function is continuous.**

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

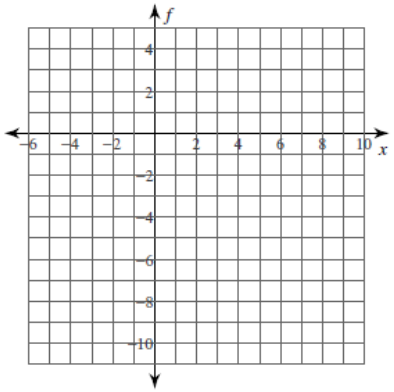



2) $f(x) = \begin{cases} 1, & x \neq 5 \\ 3, & x = 5 \end{cases}$

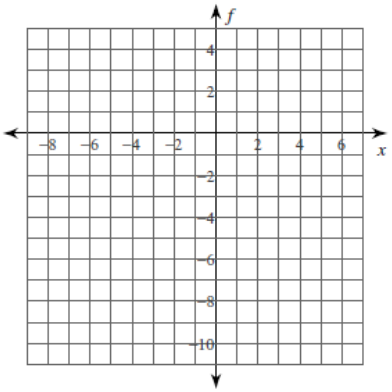



**Find the intervals on which each function is continuous. You may use the provided graph to sketch the function.**

3) $f(x) = \begin{cases} 2x - 10, & x < 2 \\ 0, & x \geq 2 \end{cases}$




4) $f(x) = \dfrac{x^2 - x - 2}{x + 1}$

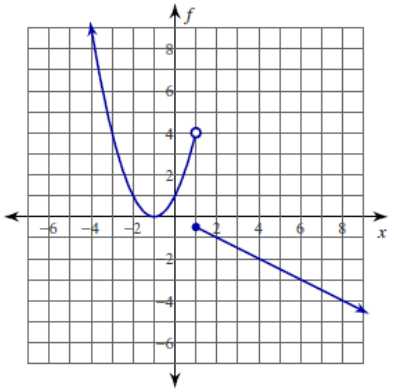


# Continuity Practice … Set 2

## Answers

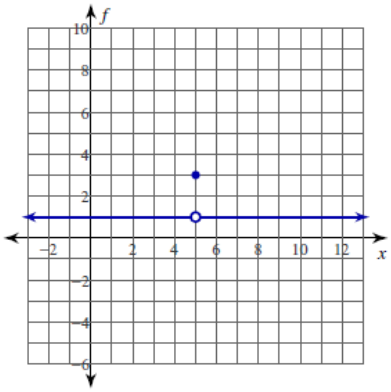
**Find the intervals on which each function is continuous.**

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




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

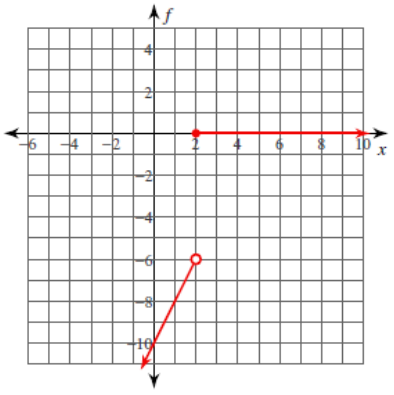
2) $f(x) = \begin{cases} 1, & x \neq 5 \\ 3, & x = 5 \end{cases}$




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

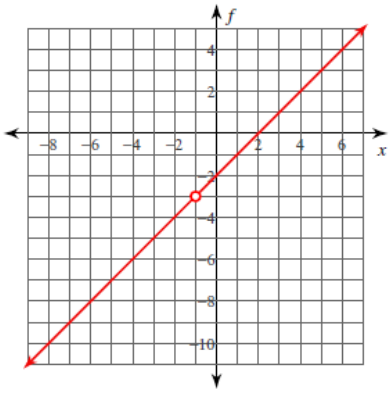
**Find the intervals on which each function is continuous. You may use the provided graph to sketch the function.**

3) $f(x) = \begin{cases} 2x - 10, & x < 2 \\ 0, & x \geq 2 \end{cases}$




$(-\infty, 2), [2, \infty)$

4) $f(x) = \dfrac{x^2 - x - 2}{x + 1}$




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

# Continuity Practice … Set 2

**Find the intervals on which each function is continuous.**

5) $f(x)=\dfrac{x^2}{2x+4}$

6) $f(x)=\begin{cases}-\dfrac{x}{2}-\dfrac{7}{2}, & x\le 0\\ -x^2+2x-2, & x>0\end{cases}$

7) $f(x)=-\dfrac{x^2-x-12}{x+3}$

8) $f(x)=\dfrac{x^2-x-6}{x+2}$

**Determine if each function is continuous. If the function is not continuous, find the *x*-axis location of and classify each discontinuity.**

9) $f(x)=-\dfrac{x^2}{2x+4}$

10) $f(x)=\dfrac{x+1}{x^2-x-2}$

11) $f(x)=\dfrac{x+1}{x^2+x+1}$

12) $f(x)=-\dfrac{x^2}{x-1}$

13) $f(x)=\begin{cases}x^2-4x+3, & x\neq 0\\ 3, & x=0\end{cases}$

14) $f(x)=\begin{cases}-x^2, & x\neq 1\\ 0, & x=1\end{cases}$

**Critical thinking questions:**

15) Give an example of a function with discontinuities at $x = 1$, 2, and 3.

16) Of the six basic trigonometric functions, which are continuous over all real numbers? Which are not? What types of discontinuities are there?

# Continuity Practice … Set 2

## Answers

**Find the intervals on which each function is continuous.**

5) $f(x)=\dfrac{x^2}{2x+4}$

$(-\infty, -2), (-2, \infty)$

6) $f(x)=\begin{cases} -\dfrac{x}{2}-\dfrac{7}{2}, & x\le 0 \\ -x^2+2x-2, & x>0 \end{cases}$

$(-\infty, 0], (0, \infty)$

7) $f(x)=-\dfrac{x^2-x-12}{x+3}$

$(-\infty, -3), (-3, \infty)$

8) $f(x)=\dfrac{x^2-x-6}{x+2}$

$(-\infty, -2), (-2, \infty)$

**Determine if each function is continuous. If the function is not continuous, find the *x*-axis location of and classify each discontinuity.**

9) $f(x)=-\dfrac{x^2}{2x+4}$

Essential discontinuity at: $x=-2$

10) $f(x)=\dfrac{x+1}{x^2-x-2}$

Removable discontinuity at: $x=-1$
Essential discontinuity at: $x=2$

11) $f(x)=\dfrac{x+1}{x^2+x+1}$

Continuous

12) $f(x)=-\dfrac{x^2}{x-1}$

Essential discontinuity at: $x=1$

13) $f(x)=\begin{cases} x^2-4x+3, & x\neq 0 \\ 3, & x=0 \end{cases}$

Continuous

14) $f(x)=\begin{cases} -x^2, & x\neq 1 \\ 0, & x=1 \end{cases}$

Removable discontinuity at: $x=1$

**Critical thinking questions:**

15) Give an example of a function with discontinuities at $x = 1$, 2, and 3.

Many answers. $\dfrac{1}{(x-1)(x-2)(x-3)}$

16) Of the six basic trigonometric functions, which are continuous over all real numbers? Which are not? What types of discontinuities are there?

Cont: sin, cos. Not cont: sec, csc, tan, cot. Essential.