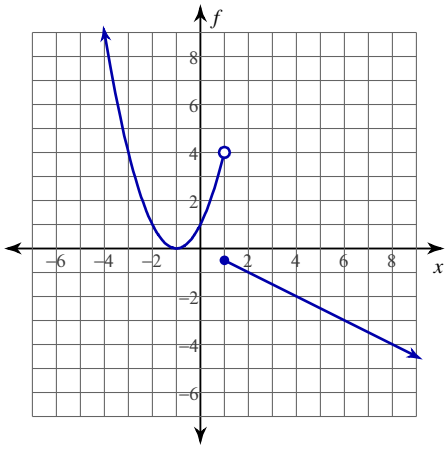
 Name_____

Continuity

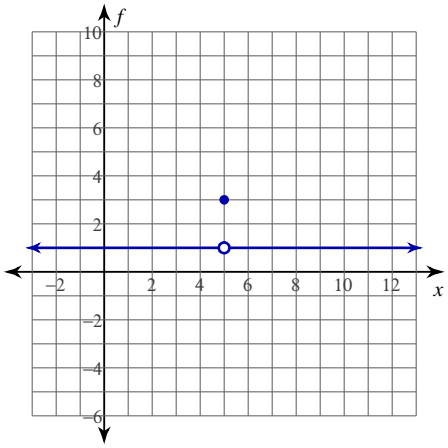
Date_____ Period____

Find the intervals on which each function is continuous.

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

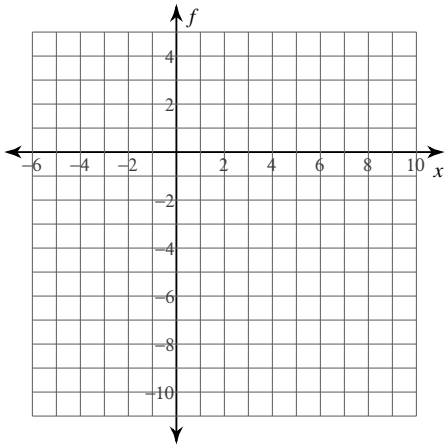


2) $f(x) = \begin{cases} 1, & x \neq 5 \\ 3, & x = 5 \end{cases}$

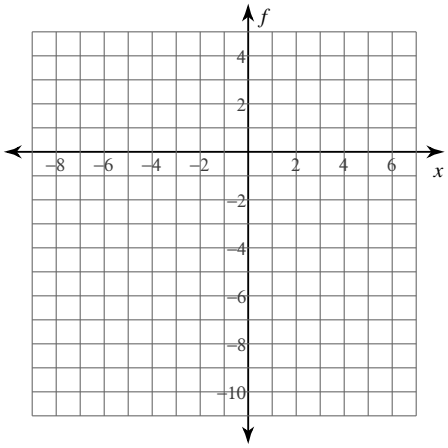


Find the intervals on which each function is continuous. You may use the provided graph to sketch the function.

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



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



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

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

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?

Kuta Software - Infinite Calculus Name_____

Continuity

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Find the intervals on which each function is continuous.

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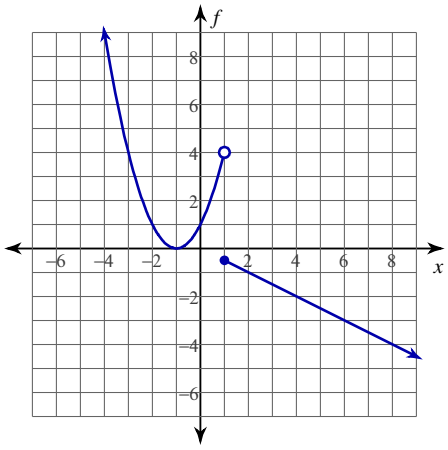
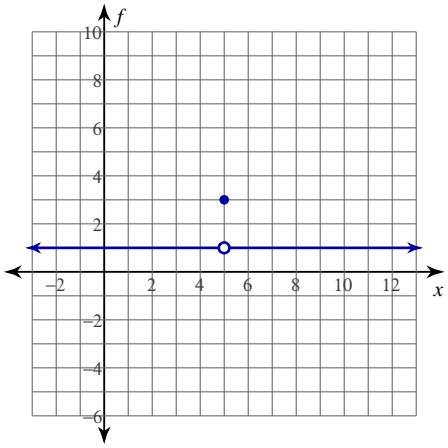


$(-\infty, 1), [1, \infty)$

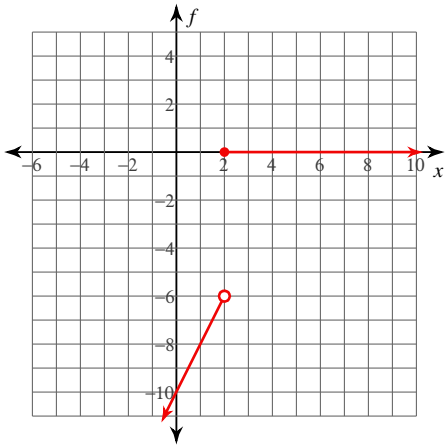
2) $f(x) = \begin{cases} 1, & x \neq 5 \\ 3, & x = 5 \end{cases}$



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

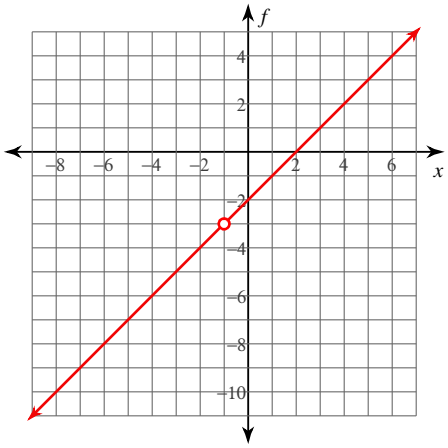
Find the intervals on which each function is continuous. You may use the provided graph to sketch the function.

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



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

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



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

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

Continuous

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

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.