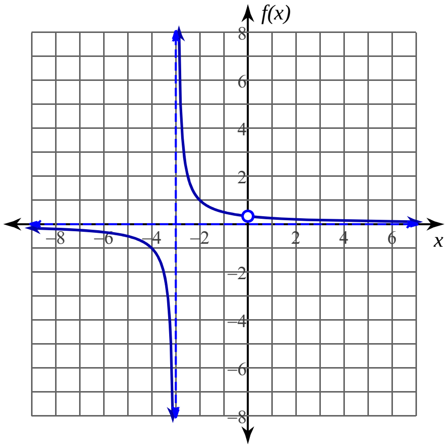
Kuta Software - Infinite Precalculus HW 12 Name____________________

Continuity

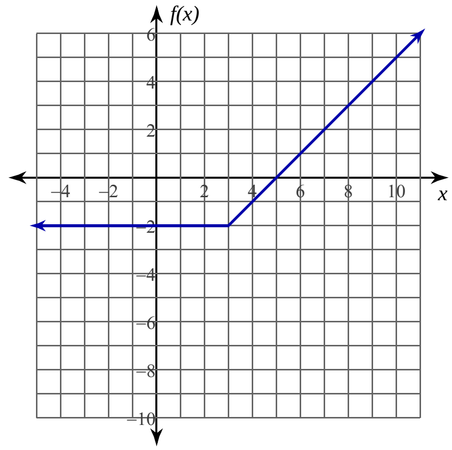
Date________________ Period____

Determine if each function is continuous at the given x-values. If not continuous, classify each discontinuity.

1) $f(x) = \frac{x}{x^2 + 3x}$; at $x = -3$ and $x = 0$



2) $f(x) = \begin{cases} -2, & x \le 3 \\ x - 5, & x > 3 \end{cases}$; at $x = 3$



3) $f(x) = \frac{x + 1}{x^2 + 2x + 2}$; at $x = -3$

4) $f(x) = \frac{x + 2}{x^2 - 4}$; at $x = -2$ and $x = 2$

5) $f(x) = \frac{x^2}{x + 1}$; at $x = -1$

6) $f(x) = \begin{cases} -2x, & x < 3 \\ -x^2 + 8x - 16, & x \ge 3 \end{cases}$; at $x = 3$

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

7) $f(x) = -\frac{x}{2x^2 + 2x + 1}$

8) $f(x) = \frac{x}{x^2 + 6x + 9}$

9) $f(x) = \dfrac{x^2 + 4x + 3}{x + 3}$

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

11) $f(x) = \begin{cases} x + 4, & x \le -2 \\ -2x - 11, & x > -2 \end{cases}$

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

Find the intervals on which each function is continuous.

13) $f(x) = \begin{cases} x, & x \ne 4 \\ 2, & x = 4 \end{cases}$

14) $f(x) = \begin{cases} -2, & x < 3 \\ -2x + 6, & x \ge 3 \end{cases}$

15) $f(x) = \dfrac{x - 1}{x^2 - 4x + 3}$

16) $f(x) = \dfrac{x^2}{2} + 4x + 10$

17) $f(x) = -x^2 - 4x + 2$

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

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

20) $f(x) = \dfrac{x}{x^2 - 6x + 9}$

Critical thinking questions:

21) Write a function that has an infinite discontinuity at $x = 100$.

22) Write a function that is continuous over $(-\infty, 0)$, $(0, 1)$, and $(1, \infty)$ and discontinuous everywhere else.

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Continuity

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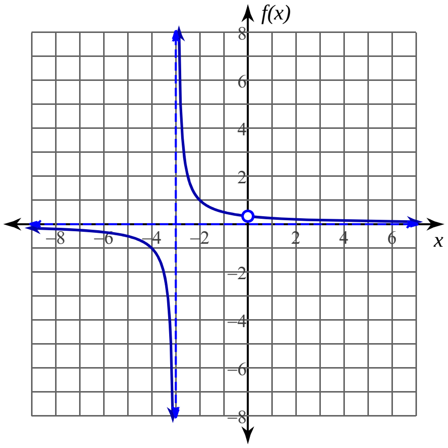
Determine if each function is continuous at the given *x*-values. If not continuous, classify each discontinuity.

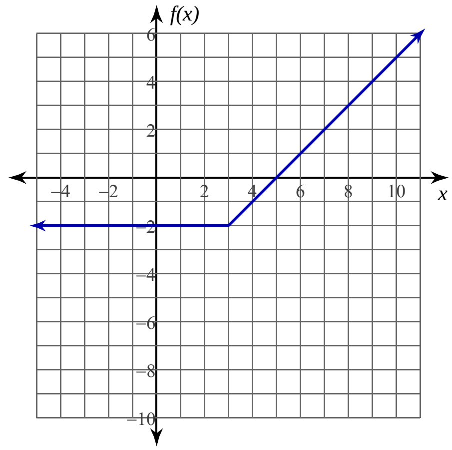
1) $f(x) = \frac{x}{x^2 + 3x}$; at $x = -3$ and $x = 0$



Removable discontinuity at $x = 0$

Infinite discontinuity at $x = -3$

2) $f(x) = \begin{cases} -2, & x \le 3 \\ x - 5, & x > 3 \end{cases}$; at $x = 3$



Continuous at $x = 3$

3) $f(x) = \frac{x + 1}{x^2 + 2x + 2}$; at $x = -3$

Continuous at $x = -3$

4) $f(x) = \frac{x + 2}{x^2 - 4}$; at $x = -2$ and $x = 2$

Removable discontinuity at $x = -2$

Infinite discontinuity at $x = 2$

5) $f(x) = \frac{x^2}{x + 1}$; at $x = -1$

Infinite discontinuity at $x = -1$

6) $f(x) = \begin{cases} -2x, & x < 3 \\ -x^2 + 8x - 16, & x \ge 3 \end{cases}$; at $x = 3$

Jump discontinuity at $x = 3$

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

7) $f(x) = -\frac{x}{2x^2 + 2x + 1}$

Continuous

8) $f(x) = \frac{x}{x^2 + 6x + 9}$

Infinite discontinuity at $x = -3$

9) $f(x) = \frac{x^2 + 4x + 3}{x + 3}$

Removable discontinuity at $x = -3$

10) $f(x) = \frac{x}{x^2 - 4x}$

Removable discontinuity at $x = 0$
Infinite discontinuity at $x = 4$

11) $f(x) = \begin{cases} x + 4, & x \le -2 \\ -2x - 11, & x > -2 \end{cases}$

Jump discontinuity at $x = -2$

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

Infinite discontinuities at $x = -3$, $x = 0$

Find the intervals on which each function is continuous.

13) $f(x) = \begin{cases} x, & x \ne 4 \\ 2, & x = 4 \end{cases}$

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

14) $f(x) = \begin{cases} -2, & x < 3 \\ -2x + 6, & x \ge 3 \end{cases}$

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

15) $f(x) = \frac{x - 1}{x^2 - 4x + 3}$

$(-\infty, 1), (1, 3), (3, \infty)$

16) $f(x) = \frac{x^2}{2} + 4x + 10$

$(-\infty, \infty)$

17) $f(x) = -x^2 - 4x + 2$

$(-\infty, \infty)$

18) $f(x) = -\frac{x - 2}{x^2 - 3x + 2}$

$(-\infty, 1), (1, 2), (2, \infty)$

19) $f(x) = -\frac{x - 1}{x^2 - x}$

$(-\infty, 0), (0, 1), (1, \infty)$

20) $f(x) = \frac{x}{x^2 - 6x + 9}$

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

Critical thinking questions:

21) Write a function that has an infinite discontinuity at $x = 100$.

$f(x) = \frac{1}{x - 100}$

22) Write a function that is continuous over $(-\infty, 0)$, $(0, 1)$, and $(1, \infty)$ and discontinuous everywhere else.

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