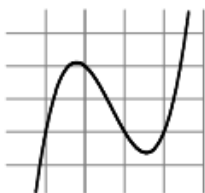
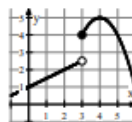
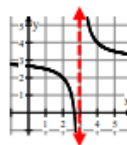
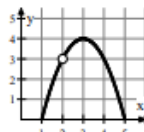


Continuity



Types of Discontinuities:

- 1.
- 2.
- 3.



For each function identify the type of each discontinuity and where it is located.

1. $f(x) = \frac{x^2 - 8x + 12}{x^2 + 3x - 10}$

2. $g(x) = \frac{x+1}{x^4 - 1}$

Defining Continuity at a Point:

Formal Definition of Continuity:

For $f(x)$ to be continuous at $x = c$, the following three conditions must be met:

- 1.
- 2.
- 3.

1. State whether the function $f(x) = \begin{cases} x^2 - 2x + 1, & x < -1 \\ x + 2, & -1 \leq x < 2 \\ 2^x, & x \geq 2 \end{cases}$ is continuous at the

given x values. Justify your answers!

a. $x = -1$

b. $x = 2$

Recall: What is a removable discontinuity?

$$\lim_{x \rightarrow c} f(x) \text{ exists, but } \lim_{x \rightarrow c} f(x) \neq f(c)$$

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

Find the x -value of the hole.

How do we find the y -value?

2. If the function f is continuous for all real numbers and if $f(x) = \frac{x^2+6x+8}{x+4}$ when $x \neq -4$, then $f(-4) =$

3. Let f be the function defined by $f(x) = \begin{cases} \frac{x^2-3x-18}{x-6}, & x \neq 6 \\ a, & x = 6 \end{cases}$. For what value of a is f continuous at $x = 6$?

5. Let f be the function defined by

$$f(x) = \begin{cases} \frac{x^2-2x-15}{x-5}, & x \neq 5 \\ a, & x = 5 \end{cases}$$

For what value of a is f continuous at $x = 5$?

6. Let f be the function defined by

$$f(x) = \begin{cases} \frac{x^2-16x+63}{x-7}, & x \neq 7 \\ b, & x = 7 \end{cases}$$

For what value of b is f continuous at $x = 7$?