Topic: Infinite discontinuities

Question: Choose the correct statement.

Answer choices:

- A An infinite discontinuity exists where the right- and left-hand limits both approach ∞ , or both approach $-\infty$.
- B An infinite discontinuity exists where the right-hand limit approaches $-\infty$ while the left-hand limit approaches ∞ .
- C An infinite discontinuity exists where the right-hand limit approaches ∞ while the left-hand limit approaches $-\infty$.
- D All of the above are true.



Solution: D

In answer choices A, B, and C, both the left-hand limit and right-hand limit are tending toward an infinite value, whether that value is $-\infty$ or ∞ .

Wherever both the left- and right-hand limit are approaching an infinite value, the function has a vertical asymptote, and therefore an infinite discontinuity.



Topic: Infinite discontinuities

Question: Choose the correct description of the infinite discontinuity.

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

Answer choices:

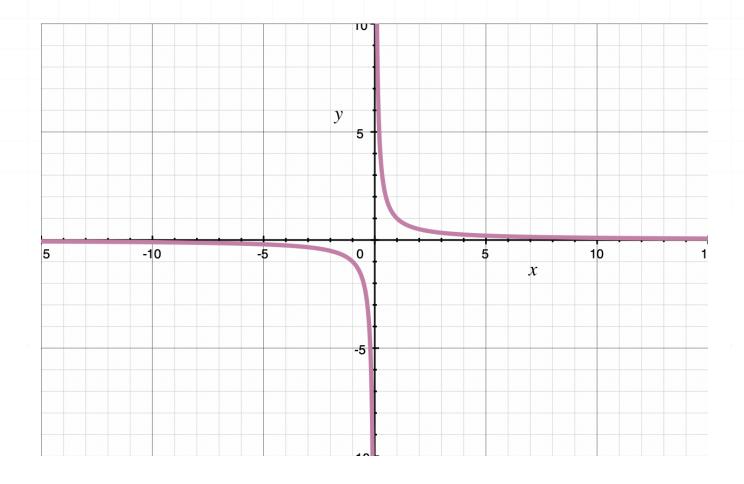
- A The function has an infinite discontinuity at x = 1.
- B The function has an infinite discontinuity at $x = -\infty$.
- C The function has an infinite discontinuity at x = 0.
- D The function has an infinite discontinuity at $x = \infty$.

Solution: C

The denominator of the function will be 0 when x=0. That discontinuity can't be removed by canceling factors from the function, so x=0 doesn't represent a point discontinuity.

Which means the function has a vertical asymptote, and therefore an infinite discontinuity, at x=0.

The graph of the function confirms the discontinuity.



Topic: Infinite discontinuities

Question: Choose the correct description of the infinite discontinuity.

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

Answer choices:

- A The function has an infinite discontinuity at x = 4.
- B The function has an infinite discontinuity at $x = -\infty$.
- C The function has an infinite discontinuity at x = -4.
- D The function has an infinite discontinuity at $x = \infty$.



Solution: A

The denominator of the function will be 0 when x=4. That discontinuity can't be removed by canceling factors from the function, so x=4 doesn't represent a point discontinuity.

Which means the function has a vertical asymptote, and therefore an infinite discontinuity, at x = 4.

The graph of the function confirms the discontinuity.

