

Rational Functions Quiz Answer Key PDF

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What is a rational function?

- A. A function that is always linear
- B. A function that can be expressed as the quotient of two polynomials ✓**
- C. A function with no variables
- D. A function that is always quadratic

The domain of a rational function excludes:

- A. Points where the numerator is zero
- B. Points where the denominator is zero ✓**
- C. All real numbers
- D. Points where both numerator and denominator are zero

Vertical asymptotes occur at values of x where:

- A. The numerator is zero
- B. The denominator is zero ✓**
- C. Both numerator and denominator are zero
- D. The function is undefined

Explain why a rational function might not have a horizontal asymptote.

If the degree of the numerator is greater than the degree of the denominator, the function will not have a horizontal asymptote but may have a slant asymptote.

If the degree of the numerator is less than the degree of the denominator, the horizontal asymptote is:

- A. $y = 0$ ✓**

- B. $y = 1$
- C. $y = \infty$
- D. No horizontal asymptote

Which features can be present in the graph of a rational function? (Select all that apply)

- A. Holes ✓**
- B. Vertical asymptotes ✓**
- C. Horizontal asymptotes ✓**
- D. Parabolas

A hole in the graph of a rational function occurs when:

- A. The numerator is zero
- B. The denominator is zero
- C. Both numerator and denominator are zero at the same point ✓**
- D. The function is undefined

Which of the following are types of asymptotes in rational functions? (Select all that apply)

- A. Vertical ✓**
- B. Horizontal ✓**
- C. Diagonal
- D. Slant ✓**

Which of the following values must be excluded from the domain of a rational function? (Select all that apply)

- A. Values that make the numerator zero
- B. Values that make the denominator zero ✓**
- C. Values that make both numerator and denominator zero ✓**
- D. Values that make the function negative

Rational functions can model which of the following scenarios? (Select all that apply)

- A. Speed and time relationships ✓**
- B. Population growth

C. Financial profit and loss ✓

D. Projectile motion

Simplifying a rational function is important for identifying:

A. The domain

B. The range

C. Holes and asymptotes ✓

D. The degree of the function

Describe the process of finding the vertical asymptotes of a rational function.**Set the denominator equal to zero and solve for x. Ensure the numerator is not zero at these points.****Provide an example of a real-world situation that can be modeled by a rational function and explain why.****A rational function can model the speed of a vehicle over time, where the speed decreases as time increases due to friction and other factors.****Discuss how the degrees of the numerator and denominator affect the end behavior of a rational function.****If the degree of the numerator is less than the denominator, the function approaches zero. If equal, it approaches the ratio of leading coefficients. If greater, the function diverges.****Given the rational function $f(x) = \frac{x^2 - 4}{x^2 - 1}$, identify any holes and vertical asymptotes.****The function has a hole at $x = 2$ and vertical asymptotes at $x = 1$ and $x = -1$.****Explain how you would identify a hole in the graph of a rational function.****To find a hole in the graph of a rational function, factor both the numerator and denominator, and identify any common factors. The x-value where these common factors equal zero indicates the location of the hole.**

To find the x-intercepts of a rational function, you set:

- A. The denominator equal to zero
- B. The numerator equal to zero ✓**
- C. Both numerator and denominator equal to zero
- D. The function equal to zero

The end behavior of a rational function is determined by:

- A. The coefficients of the numerator
- B. The degrees of the numerator and denominator ✓**
- C. The x-intercepts
- D. The y-intercepts

Simplifying a rational function can help identify: (Select all that apply)

- A. Holes ✓**
- B. X-intercepts
- C. Vertical asymptotes ✓**
- D. Horizontal asymptotes

A rational function has a horizontal asymptote when: (Select all that apply)

- A. The degree of the numerator is less than the degree of the denominator ✓**
- B. The degree of the numerator equals the degree of the denominator ✓**
- C. The degree of the numerator is greater than the degree of the denominator
- D. The numerator is a constant