

27 Properties of Rational Functions

Due:

12/14/2015 at 06:00am EST.

Students will be able to:

- Identify domain of rational functions
- Identify vertical asymptotes of rational functions
- Identify horizontal or slanted asymptotes of rational functions
- Identify any holes a graph of rational function might have
- Find the x -intercepts and y -intercepts of a graph of rational function

Functions and symbols that WeBWorK understands.

Links to some useful WeBWorK pages for students

1. (1 pt) Consider the function

$$f(x) = \frac{-4}{4x-3}$$

Find the vertical asymptote(s). If there is more than one vertical asymptote give a list of the x -values separated by commas.
 $x =$ _____

If this function has a horizontal asymptote, give its y -value. If there is no horizontal asymptote, type in *none* .

Find the x -intercept(s). If there is more than one x -intercept give a list of the x -values separated by commas. If there is no x -intercept type in *none* .
 $x =$ _____

Find the y -intercept

$y =$ _____

2. (1 pt) Consider the function

$$f(x) = \frac{-4x+8}{9x+7}$$

Enter the equations of the vertical asymptotes. If there are no vertical asymptotes, enter *none* . If there is more than one vertical asymptote, enter a list of the equations separated by a comma (e.g., $x=20$, $x=-7$).

Vertical asymptotes: _____

Enter the equations of the horizontal asymptotes. If there are no horizontal asymptotes, enter *none* . If there is more than one horizontal asymptote, enter a list of the equations separated by a comma (e.g., $y=20$, $y=-7$).

Horizontal asymptotes: _____

Find the x -intercept(s). If there is more than one x -intercept give a list of the x -intercepts separated by commas (i.e.: (1,2),(3,4)). If there is no x -intercept type in *none* .

x -intercepts: _____

Find the y -intercept: _____

Find the domain of $f(x)$: _____

Give your answer in **interval notation**.

3. (1 pt) Consider the function

$$f(x) = \frac{8x-7}{x^2+3x-10}$$

Find the vertical asymptote(s). If there is more than one vertical asymptote give a list of the x -values separated by commas.
 $x =$ _____

If this function has a horizontal asymptote, give its y -value. If there is no horizontal asymptote, type in *None* .

Find the x -intercept(s). If there is more than one x -intercept give a list of the x -values separated by commas.

$x =$ _____

Find the y -intercept

$y =$ _____

4. (1 pt) Consider the function

$$f(x) = \frac{x^2-4x-32}{x^2+7x}$$

Find the vertical asymptote(s). If there is more than one vertical asymptote give a list of the x -values separated by commas.
 $x =$ _____

If this function has a horizontal asymptote, give its y -value. If there is no horizontal asymptote, type in *None* .

Find the x -intercept(s). If there is more than one x -intercept give a list of the x -values separated by commas.

$x =$ _____

Find the y -intercept. If there is no y -intercept type in *None* .

$y =$ _____

5. (1 pt) Consider the function

$$f(x) = \frac{2x + 4}{(8x + 5)(7x + 10)}$$

Enter the equations of the vertical asymptotes. If there are no vertical asymptotes, enter *none*. If there is more than one vertical asymptote, enter a list of the equations separated by a comma (e.g., $x=20, x=-7$).

Vertical asymptotes: _____

Enter the equations of the horizontal asymptotes. If there are no horizontal asymptotes, enter *none*. If there is more than one horizontal asymptote, enter a list of the equations separated by a comma (e.g., $y=20, y=-7$).

Horizontal asymptotes: _____

Find the x -intercept(s). If there is more than one x -intercept give a list of the x -intercepts separated by commas (i.e.: (1,2),(3,4)). If there is no x -intercept type in *none*.

x -intercepts: _____

Find the y -intercept: _____

Find the domain of $f(x)$: _____

Give your answer in **interval notation**.

6. (1 pt) Consider the function

$$f(x) = \frac{x - 5}{(-2x + 7)(5x + 2)}$$

Enter the equations of the vertical asymptotes. If there are no vertical asymptotes, enter *none*. If there is more than one vertical asymptote, enter a list of the equations separated by a comma (e.g., $x=20, x=-7$).

Vertical asymptotes: _____

Enter the equations of the horizontal asymptotes. If there are no horizontal asymptotes, enter *none*. If there is more than one horizontal asymptote, enter a list of the equations separated by a comma (e.g., $y=20, y=-7$).

Horizontal asymptotes: _____

7. (1 pt) Consider the function

$$f(x) = \frac{(-6x + 5)(9x + 3)}{(5x - 9)(x + 9)}$$

Enter the equations of the vertical asymptotes. If there are no vertical asymptotes, enter *none*. If there is more than one vertical asymptote, enter a list of the equations separated by a comma (e.g., $x=20, x=-7$).

Vertical asymptotes: _____

Enter the equations of the horizontal asymptotes. If there are no horizontal asymptotes, enter *none*. If there is more than one horizontal asymptote, enter a list of the equations separated by a comma (e.g., $y=20, y=-7$).

Horizontal asymptotes: _____

Find the x -intercept(s). If there is more than one x -intercept give a list of the x -intercepts separated by commas (i.e.: (1,2),(3,4)). If there is no x -intercept type in *none*.

x -intercepts: _____

Find the y -intercept: _____

Find the domain of $f(x)$: _____

Give your answer in **interval notation**.

8. (1 pt) Consider the function

$$f(x) = \frac{x^2 + 4x - 45}{x - 5}$$

Find the vertical asymptote(s). If there is more than one vertical asymptote give a list of the x -values separated by commas. If there is no vertical asymptote, type in *None*.

$x =$ _____

If this function has a horizontal asymptote, give its y -value. If there is no horizontal asymptote, type in *None*.

Find the x -intercept(s). If there is more than one x -intercept give a list of the x -values separated by commas.

$x =$ _____

Find the y -intercept

$y =$ _____

9. (1 pt) Consider the function

$$f(x) = \frac{x^2 - 16}{x^2 - 25}$$

Find the vertical asymptote(s). If there is more than one vertical asymptote give a list of the x -values separated by commas.
 $x =$ _____

If this function has a horizontal asymptote, give its y -value. If there is no horizontal asymptote, type in *None* .

Find the x -intercept(s). If there is more than one x -intercept give a list of the x -values separated by commas.

$$x =$$

Find the y -intercept

$$y =$$

10. (1 pt) Consider the function

$$f(x) = \frac{(7x-1)(-x-4)}{(x+7)(7x-1)}$$

What is the vertical asymptote that is furthest left?

$$x =$$

What is the vertical asymptote that is furthest right?

$$x =$$

What is the horizontal asymptote?

$$y =$$

11. (1 pt) For the function

$$f(x) = \frac{x-6}{(-2x+3)(5x+3)}$$

What are the vertical asymptotes? Give a list of the x -values of the asymptotes separated by commas.

$$x =$$

What is the horizontal asymptote?

$$y =$$

12. (1 pt) Consider the function

$$f(x) = \frac{4x+7}{(7x+2)(4x+1)}$$

Find the vertical asymptote(s). If there is more than one vertical asymptote give a list of the x -values separated by commas. If there are no vertical asymptotes, type in *none* .

$$x =$$

If this function has a horizontal asymptote, give its y -value. If there is no horizontal asymptote, type in *none* .

$$y =$$

Find the x -intercept(s). If there is more than one x -intercept give a list of the x -intercepts separated by commas (i.e.: (1,2),(3,4)). If there is no x -intercept type in *none* .

Find the y -intercept

Find the domain. Write a comma separated list of all the x values that are not in the domain. If there are no such x , type *none* in the answer blank.

$$x \neq$$

13. (1 pt) For the function

$$f(x) = \frac{(7x-3)}{(-3x-5)(4x-3)}$$

What are the vertical asymptotes? Give a list of the x -values of the asymptotes separated by commas.

$$x =$$

What is the horizontal asymptote?

$$y =$$

What are the x -intercepts? Give a list of the x -intercepts separated by commas (i.e.: (1,2),(3,4)). If there are no x -intercepts, type in *none* .

x -intercepts: _____

What is the y -intercept?

y -intercept: _____

14. (1 pt) Consider the function

$$f(x) = \frac{x^4 + 20}{x^2 - 4x + 7}$$

What are the vertical asymptotes? Give a list of the x -values of the asymptotes separated by commas. If there are none, enter *None* .

$$x =$$

What is the horizontal asymptote? If there are none, enter *None* .

$$y =$$

What are the x -intercepts? Give a list of the x -values of the x -intercepts separated by commas. If there are none, enter *None* .

$$x =$$

What is the y -intercept? If there are none, enter *None* .

$$y =$$

15. (1 pt) Let

$$f(x) = \frac{8x^3 - 18x^2 - 207x + 162}{-4x^3 + 3x^2 + 196x - 147}$$

The domain of the function $f(x)$ is: _____

Use **interval notation** to enter your answer.

The root(s) of $f(x)$ is/are: _____

Enter the root(s) as a comma-separated list.

$f(x)$ has one hole at the point: (____, ____).

$f(x)$ has vertical asymptotes for the following x value(s):
_____.

Enter the asymptote(s) x -values as a comma-separated list.

$f(x)$ has a horizontal asymptote at $y =$ _____