

Student: _____
Date: _____

Instructor: Andreas Lazari
Course: Math1111-Summer2018

Assignment: Section 3.5 Homework

1. Find the domain of the following rational function.

$$R(x) = \frac{8x}{x-3}$$

$$x-3=0 \Rightarrow x=3 \Rightarrow D: x \neq 3$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The domain of $R(x)$ is $\{x|x \neq 3\}$. (Type an integer or a fraction. Use a comma to separate answers as necessary.)
- B. There are no restrictions on the domain of $R(x)$.

2. Find the domain of the following rational function.

$$H(x) = \frac{-9x^2}{(x-2)(x+4)}$$

$$(x-2)=0 \Rightarrow x=2$$
$$(x+4)=0 \Rightarrow x=-4$$

$$D: x \neq -4, 2$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The domain of $H(x)$ is $\{x|x \neq -4, 2\}$. (Type an integer or a fraction. Use a comma to separate answers as needed.)
- B. The domain of $H(x)$ has no restrictions.

3. Find the domain of the following rational function.

$$H(x) = \frac{18x^2 + x}{x^2 + 2}$$

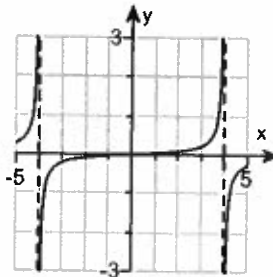
\rightarrow Denominator is always not zero.

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The domain of $H(x) = \frac{18x^2 + x}{x^2 + 2}$ is $\{x|x \neq \underline{\hspace{2cm}}\}$.
(Type an integer or a fraction. Use a comma to separate answers as needed.)
- B. There are no restrictions on the domain of $H(x)$.

4. Use the graph of the rational function to complete the following statement.

As $x \rightarrow -4^-$, $f(x) \rightarrow \underline{\hspace{2cm}}$.

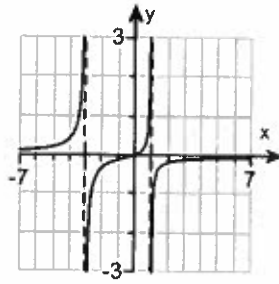


-4^- it means the function is approaching -4 from the left.

As $x \rightarrow -4^-$, $f(x) \rightarrow \underline{+\infty}$.

5. Use the graph of the rational function to complete the following statement.

As $x \rightarrow -\infty$, $f(x) \rightarrow$ ____.



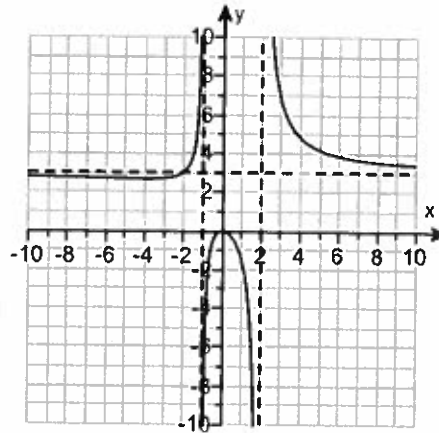
As $x \rightarrow -\infty$, $f(x) \rightarrow$ 0.

6. Use the graph of the rational function to complete the following statement.

As $x \rightarrow 2^+$, $f(x) \rightarrow$ ____.

As $x \rightarrow 2^+$, $f(x) \rightarrow$ ∞ .

2^+ . The function approaches 2 from the right.

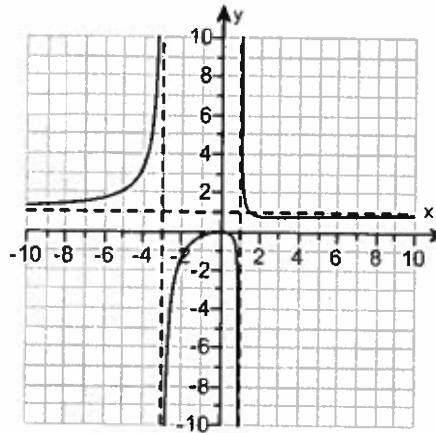


Asymptotes are shown as dashed lines. The horizontal asymptote is $y = 3$. The vertical asymptotes are $x = -1$ and $x = 2$.

7. Use the graph of the rational function to complete the following statement.

As $x \rightarrow \infty$, $f(x) \rightarrow$ ____.

As $x \rightarrow \infty$, $f(x) \rightarrow$ 1.



Asymptotes are shown as dashed lines. The horizontal asymptote is $y = 1$. The vertical asymptotes are $x = -3$ and $x = 1$.

8. Find the vertical asymptotes, if any, and the values of x corresponding to holes, if any, of the graph of the rational function.

$$h(x) = \frac{x}{x(x-5)}$$

$X=0; X=5$ makes the denominator zero
 \rightarrow simplify: $\frac{x}{x(x-5)} = \frac{1}{x-5}$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice. (Type an equation. Use commas to separate answers as needed.)

Note: $X=0$ makes both Numerator and denominator equal to zero. After simplifying

$$h(x) = \frac{1}{x-5}$$

the denominator is Not zero for

$X=0$. $X=5$ still makes the denominator zero. 5 is a vertical asymptote.

A. The vertical asymptote(s) is(are) 5 and hole(s) corresponding to 0.

B. There are no vertical asymptotes but there is(are) hole(s) corresponding to _____.

C. The vertical asymptote(s) is(are) _____. There are no holes.

D. There are no discontinuities.

9. Find the vertical asymptotes, if any, and the value of x corresponding to holes, if any, of the graph of the following rational function.

$$f(x) = \frac{x^2 - 64}{x - 8}$$

$X=8$
 Simplify: $f(x) = \frac{(x-8)(x+8)}{x-8} = x+8$; the denominator is Not zero for $X \neq 8$.

Select the correct choice below and, if necessary, fill in the answer box to complete your choice. (Type an integer or a fraction. Use commas to separate answers as needed.)

A. There are no vertical asymptotes but there is (are) hole(s) corresponding to $x =$ 8.

B. Vertical asymptote(s) at $x =$ _____. There are no holes.

C. Vertical asymptote(s) at $x =$ _____ and hole(s) corresponding to $x =$ _____.

D. There are no discontinuities.

10. Find the vertical asymptotes, if any, and the value of x corresponding to holes, if any, of the graph of the following rational function.

$$f(x) = \frac{x-6}{x^2-36}$$

Simplify: $\frac{x-6}{(x-6)(x+6)}$

$$x-36=0 \Rightarrow (x-6)(x+6)=0$$

$$x = -6, 6$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice. (Type an integer or a fraction. Use a comma to separate answers as needed.)

A. Vertical asymptote(s) at $x =$ -6. There are no holes.

B. There are no vertical asymptotes but there is (are) hole(s) corresponding to $x =$ _____.

C. Vertical asymptote(s) at $x =$ -6 and hole(s) corresponding to $x =$ 6.

D. There are no discontinuities.

11. Find the horizontal asymptote, if any, of the graph of the rational function.

$$f(x) = \frac{16x}{7x^2 + 3}$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The horizontal asymptote is $y=0$. (Type an equation.)
 B. There is no horizontal asymptote.

If the power of x in the Numerator is less than the power of x in the denominator the horizontal asymptote is at $y=0$.

12. Find the horizontal asymptote, if any, of the graph of the rational function.

$$g(x) = \frac{10x^2}{5x^2 + 6}$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The horizontal asymptote is $y=2$. (Type an equation.)
 B. There is no horizontal asymptote.

If the power of x in the Numerator is equal to the power of x in the denominator then retain on the terms and simplify.

$$\frac{10x^2}{5x^2} = \frac{10}{5} = 2$$

at $y=2$ is the horizontal asymptote.

13. Find the horizontal asymptote, if any, of the graph of the rational function.

$$h(x) = \frac{16x^3}{5x^2 + 8}$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The horizontal asymptote is _____ . (Type an equation.)
 B. There is no horizontal asymptote.

If the power of x in the Numerator is greater than the power of x in the denominator then there is NO horizontal asymptote.

1. A.

The domain of $R(x)$ is $\{x|x \neq \underline{3}\}$. (Type an integer or a fraction. Use a comma to separate answers as necessary.)

2. A.

The domain of $H(x)$ is $\{x|x \neq \underline{2, -4}\}$. (Type an integer or a fraction. Use a comma to separate answers as needed.)

3. B. There are no restrictions on the domain of $H(x)$.

4. ∞

5. 0

6. ∞

7. 1

8. A. The vertical asymptote(s) is(are) $\underline{x = 5}$ and hole(s) corresponding to $\underline{x = 0}$.

9. A. There are no vertical asymptotes but there is (are) hole(s) corresponding to $x = \underline{8}$.

10. C. Vertical asymptote(s) at $x = \underline{-6}$ and hole(s) corresponding to $x = \underline{6}$.

11. A. The horizontal asymptote is $\underline{y = 0}$. (Type an equation.)

12. A. The horizontal asymptote is $\underline{y = 2}$. (Type an equation.)

13. B. There is no horizontal asymptote.
