6.2

Due Fri 02/05/2021 11:59 pm

Instructional videos on Mod. 6, Inv. 2 (End Behavior of Rational Functions) and (Strategies for Determining End Behavior) found in the Pathways PreCalculus online textbook. If you are not logged into rationalreasoning.net, you will be asked to log in prior to accessing the videos.

Consider the function $f(x) = \frac{1}{x+4}$.

a. Complete the table of values below.

x	$f(x) = \frac{1}{x+4}$
-100000	-.99996
-10000	-.9996
-100	-.96
100	.104
10000	.10004
100000	.100004

b. Based on your table in part (a), complete the following statements.

i. As $x \to -\infty$, $f(x) \to$ 0 Preview

ii. As $x \to \infty$, $f(x) \to$ 0 Preview

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Question 1. Points possible: 3
Unlimited attempts.
Score on last attempt: 3. Score in gradebook: 3

Consider the rational function $f(x) = \frac{8x}{x-5}$.

a. On your own, complete the following table of values.

x	$8x$	$x-5$	$f(x) = \frac{8x}{x-5}$
-100000			
-10000			
-1000			
1000			
10000			
100000			

b. Based on your results in part (a), complete the following statements.

i. As $x \to -\infty$, $f(x) \to$ 8 Preview

ii. As $x \to \infty$, $f(x) \to$ 8 Preview

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Question 2. Points possible: 2
Unlimited attempts.
Score on last attempt: 2. Score in gradebook: 2

Consider the rational function $f(x) = \frac{x-4}{x^2+4x+18}$.

a. What monomial expression best estimates the behavior of $x-4$ as $x \to \pm\infty$?

x Preview

b. What monomial expression best estimates the behavior of $x^2+4x+18$ as $x \to \pm\infty$?

x^2 Preview

c. Using your results from parts (a) and (b), write a *ratio* of monomial expressions that best estimates the behavior of $\frac{x-4}{x^2+4x+18}$ as $x \to \pm\infty$. Simplify your answer as much as possible.

Preview

d. Based on your answer to part (c), what happens to the value of $f(x)$ as $x \to \pm\infty$? (Hint: now your answer should be a number, ∞, $-\infty$, or "DNE".)

As $x \to \pm\infty$, $f(x) \to$ Preview

e. Based on your answer to part (d), what is the horizontal asymptote of f? If no horizontal asymptote exists for f, enter "DNE".

$y =$ Preview

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Question 3. Points possible: 5
Unlimited attempts.
Score on last attempt: 2. Score in gradebook: 2

Consider the rational function $f(x) = \frac{6x+15}{3x-14}$.

a. What monomial expression best estimates the behavior of $6x+15$ as $x \to \pm\infty$?

6x Preview

b. What monomial expression best estimates the behavior of $3x-14$ as $x \to \pm\infty$?

3x Preview

c. Using your results from parts (a) and (b), write a *ratio* of monomial expressions that best estimates the behavior of $\frac{6x+15}{3x-14}$ as $x \to \pm\infty$. Simplify your answer as much as possible.

Preview

d. Based on your answer to part (c), what happens to the value of $f(x)$ as $x \to \pm\infty$? (Hint: now your answer should be a number, ∞, $-\infty$, or "DNE".)

As $x \to \pm\infty$, $f(x) \to$ Preview

e. Based on your answer to part (d), what is the horizontal asymptote of f? If no horizontal asymptote exists for f, enter "DNE".

$y =$ Preview

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Question 4. Points possible: 5
Unlimited attempts.
Score on last attempt: 2. Score in gradebook: 2

Consider the rational function $f(x) = \frac{4x^4+9x+19}{8x^3-14}$.

a. What monomial expression best estimates the behavior of $4x^4+9x+19$ as $x \to \pm\infty$?

4x^4 Preview

b. What monomial expression best estimates the behavior of $8x^3-14$ as $x \to \pm\infty$?

8x^3 Preview

c. Using your results from parts (a) and (b), write a *ratio* of monomial expressions that best estimates the behavior of $\frac{4x^4+9x+19}{8x^3-14}$ as $x \to \pm\infty$. Simplify your answer as much as possible.

Preview

d. Based on your answer to part (c), what happens to the value of $f(x)$ as $x \to \pm\infty$? (Hint: now your answer should be a number, ∞, $-\infty$, or "DNE".)

As $x \to \pm\infty$, $f(x) \to$ Preview

e. Based on your answer to part (d), what is the horizontal asymptote of f? If no horizontal asymptote exists for f, enter "DNE".

$y =$ Preview

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Question 5. Points possible: 5
Unlimited attempts.
Score on last attempt: 2. Score in gradebook: 2

For each of the following rational functions, determine the horizontal asymptote for the rational function. If the function does not have a horizontal asymptote, enter "DNE".

a. $f(x) = \frac{4x}{10x+15}$

$y =$ 4 Preview

b. $g(x) = \frac{4}{11x^2-277}$

$y =$ Preview

c. $h(x) = \frac{x^7-1}{x^5-1}$

$y =$ Preview

d. $j(x) = \frac{7x^3+5}{-6(x-11)(x+22)(x+39)}$

$y =$ Preview

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Question 6. Points possible: 4
Unlimited attempts.
Score on last attempt: 0. Score in gradebook: 0

Consider the function $f(x) = \frac{x^2+7}{(6x-10)(x+4)}$. For each prompt below, if no solution exists - enter "DNE". If there is more than one solution, enter your answer as a comma-separated list (like "1, 3"). *You may find it helpful to rewrite the numerator or denominator in a different form to help you complete some of the parts.*

a. Determine the vertical intercept of f.

$f(0) =$ Preview

b. Determine the zeros (or "roots") of f.

$x =$ Preview

c. Determine the vertical asymptote(s) of f.

$x =$ Preview

d. Determine the horizontal asymptote of f.

$y =$ Preview

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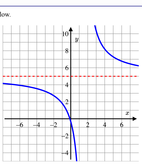
Question 7. Points possible: 4
Unlimited attempts.

The graph of a rational function f is shown below.



a. What is the horizontal asymptote of f?

$y =$ 5 Preview

b. Complete the following statements:

i. As $x \to -\infty$, $f(x) \to$ 5 Preview

ii. As $x \to \infty$, $f(x) \to$ 5 Preview

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Question 8. Points possible: 2
Unlimited attempts.
Score on last attempt: 2. Score in gradebook: 2

Consider the following rational function:

$$f(x) = \frac{a_n x^n + a_{n-1}x^{n-1} + ... + a_1 x + a_0}{b_m x^m + b_{m-1}x^{m-1} + ... + b_1 x + b_0}$$

a. Which of the following conditions entails that f has a horizontal asymptote at $y = 0$? Select all that apply.

- ☐ $m = n$
- ☐ $m < n$
- ☑ $m > n$

b. Which of the following conditions entails that f has a horizontal asymptote at $y = a$ where $a \neq 0$? Select all that apply.

- ☑ $m = n$
- ☐ $m < n$
- ☐ $m > n$

c. Which of the following conditions entails that f does not have a horizontal asymptote? Select all that apply.

- ☐ $m = n$
- ☑ $m < n$
- ☐ $m > n$

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Question 9. Points possible: 3
Unlimited attempts.
Score on last attempt: 3. Score in gradebook: 3

Total Points Possible: 33

When you are done, click here to see a summary of your score