

Unit 3 Test

End Behavior, Zeros, Asymptotes & Graphing Techniques

Name: _____ Date: _____ Score: ____ / 10

INSTRUCTIONS

For multiple-choice questions, circle the letter of the correct answer. For short-answer and problem-solving questions, show your complete work in the space provided. No calculator unless your teacher says otherwise.

1

Describe the end behavior of $f(x) = -2x^4 + 3x - 1$ as $x \rightarrow \pm\infty$.

Multiple Choice

ABoth ends go to $-\infty$ **B**Both ends go to $+\infty$ **C**Left end to $-\infty$, right end to $+\infty$ **D**Left end to $+\infty$, right end to $-\infty$ **2**

Find all real zeros of $f(x) = x^3 - 4x$.

Multiple Choice

A

0, 2, -2

B

0, 4, -4

C

2, -2

D

0 only

3

Short Answer — Use synthetic (or long) division to divide $x^3 - 2x^2 - 5x + 6$ by $(x - 3)$. State the quotient and remainder.

Short Answer

4

Find the vertical asymptote(s) of $f(x) = (x + 1)/(x^2 - 9)$.

Multiple Choice

A $x = 3$ and $x = -3$ **B** $x = 1$ only**C** $x = 9$ and $x = -9$ **D**

No vertical asymptotes

5

Find the horizontal asymptote of $f(x) = (3x^2 + 1)/(x^2 - 4)$.

Multiple Choice

A $y = 3$ **B** $y = 1$ **C** $y = 0$ **D**

No horizontal asymptote

6

Short Answer — Find the domain of $f(x) = (x - 2)/(x^2 - x - 6)$.

Short Answer

Unit 3 Test

End Behavior, Zeros, Asymptotes & Graphing Techniques

7**Find all real zeros of $f(x) = x^3 - 3x^2 - 4x + 12$.**

Multiple Choice

A

-2, 2, 3

B

-2, 2, -3

C

2, 3, 4

D

-3, -2, -4

8**Which function has a slant (oblique) asymptote?**

Multiple Choice

A $f(x) = (x^2 + 1)/(x - 1)$ **B** $f(x) = (x + 1)/(x^2 - 1)$ **C** $f(x) = (3x^2 + 2)/(x^2 - 5)$ **D** $f(x) = 5/x$ **9****Problem Solving — Find the equation of the slant asymptote of $f(x) = (x^2 + 3x + 1)/(x - 2)$ using polynomial division. Show all steps.**

Problem Solving

10**Problem Solving — For $f(x) = (x^2 - 4)/(x - 2)$, simplify the function and describe the discontinuity (hole) in its graph, including its exact location.**

Problem Solving