AP Precalculus · Topic 1.7 — Worksheet B

Rational Functions and End Behavior | Show complete work in each box.

Name: _____ Date: _____ Period: _____

Part I · State each domain in interval notation.

1. Find the domain; explain excluded values.

$$\frac{x^3 - 2}{x^2 + x - 20}$$

2. Find the domain; explain excluded values.

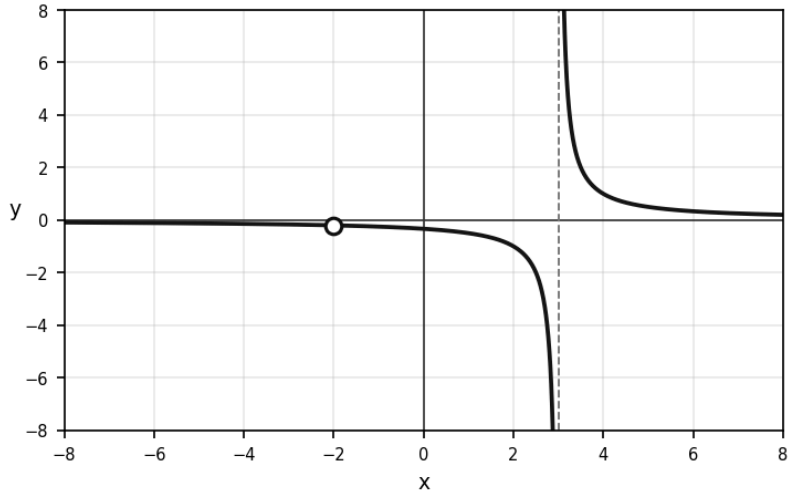
$$\frac{x - 4}{x^2 - 2x - 15}$$

3. Find the domain; explain excluded values.

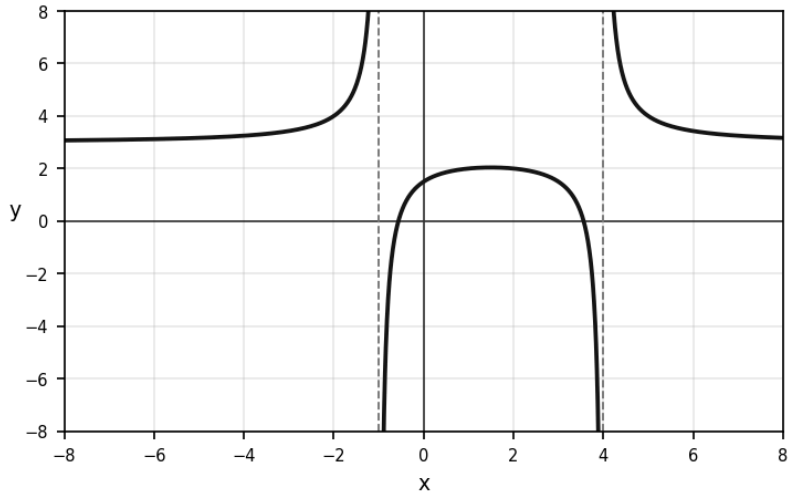
$$\frac{t^2 + 5}{4t + 8}$$

Part II · Analyze each graph: domain, end-behavior limits, and horizontal asymptote (if any).

4. Use the plotted graph; identify any hole or excluded x-value.



5. Use the plotted graph; identify any hole or excluded x-value.



Part III · Calculator active. Complete the tables and find both end limits and any HA.

6. Evaluate the function at the six input values.

$$\frac{3x-2}{x^2+2x-8}$$

Input:	−10000	−1000	−100	100	1000	10000
Output:	_____	_____	_____	_____	_____	_____

7. Evaluate the function at the six input values.

$$\frac{2t^3-5}{t^3+t^2+1}$$

Input:	−10000	−1000	−100	100	1000	10000
Output:	_____	_____	_____	_____	_____	_____

Part IV · Determine whether each horizontal asymptote exists. Justify using degrees.

8. Horizontal asymptote (or none); explain.

$$\frac{6x^2 + x - 3}{3x^2 - 2x + 7}$$

9. Horizontal asymptote (or none); explain.

$$\frac{5x - 1}{x^3 - 7}$$

10. Horizontal asymptote (or none); explain.

$$\frac{4x^3 + 3}{x^2 + 2}$$

11. Horizontal asymptote (or none); explain.

$$\frac{(2x + 1)^2}{(5x - 4)^2}$$

Part V · Determine any slant asymptote. Then evaluate the indicated limits.

12. Find the slant asymptote, if one exists. Show division.

$$\frac{2x^2 - x + 5}{x + 3}$$

13. Find the slant asymptote, if one exists. Show division.

$$\frac{x^3 + 2x^2 + 1}{x - 4}$$

14. Evaluate the end limit: $x \to +\infty$

$$\frac{5x^2 - 3}{2x^2 + 4x + 1}$$

15. Evaluate the end limit: $x \to -\infty$

$$\frac{2x^3 - 5}{x^2 + 1}$$

16. Evaluate the end limit: $x \to +\infty$

$$\frac{9x^2 + 1}{(x + 5)(3x - 2)}$$

Part VI · Write BOTH end-behavior limits. Explain using leading terms.

17. Evaluate the limits as $x \to -\infty$ and $x \to +\infty$.

$$\frac{2x^4 + x}{x - 2}$$

18. Evaluate the limits as $x \to -\infty$ and $x \to +\infty$.

$$\frac{-x^6 + 7x}{2x^2 + 1}$$

19. Evaluate the limits as $x \to -\infty$ and $x \to +\infty$.

$$\frac{4x^5 - x}{3 - x^2}$$

20. Evaluate the limits as $x \to -\infty$ and $x \to +\infty$.

$$\frac{2x^4 + x^2}{3x^2 + 2}$$