

Graphing Rational Functions & Asymptotes - F.IF.7D

1

Graph the following rational function.

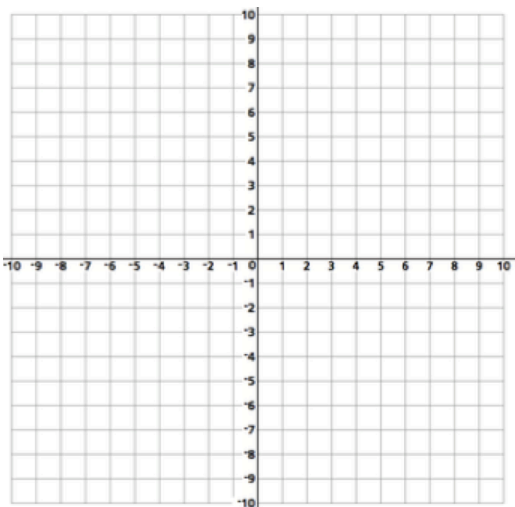
$$y = \frac{2x + 5}{x - 2}$$

Label and draw the following:

Horizontal Asymptote:

Vertical Asymptote:

x – intercept:



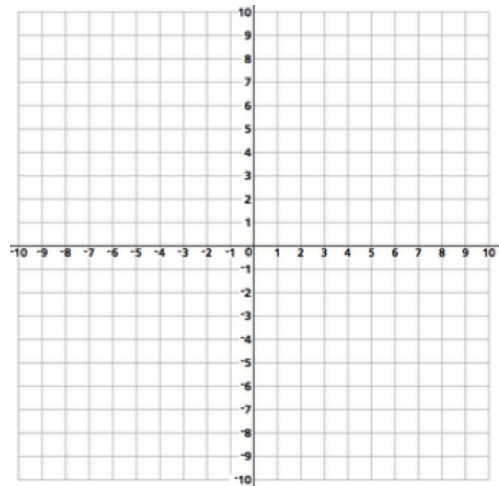
2

Graph the following rational function.

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

Does the function have any holes?

If yes, where?



3

Find any points of discontinuity for the rational function.

$$y = \frac{x + 3}{x^2 - x - 72}$$

4

Describe the vertical asymptote(s) and hole(s) for the graph of the following rational function.

$$y = \frac{x - 3}{x^2 + x - 12}$$

5

Find the horizontal asymptote of the following rational function. Justify your answer using 2 sentences.

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

Arithmetic With Rational Expressions A.APR.6

6

What is the product in simplest form?

$$\frac{25n^3}{p^4} \cdot \frac{2p^2}{5n^2}$$

7

Simplify.

$$\frac{x^2 - 3x - 54}{x + 6}$$

8

Simplify.

$$\frac{x^2 + 2x - 35}{x^2 - 7x + 10}$$

9

Simplify:  $\frac{3x^2 - 6x}{4 - x^2} \cdot \frac{3x^2 + 5x - 2}{27x^2 - 3}$

A.  $\frac{-x}{3x + 1}$

B.  $\frac{-x(x - 2)}{(3x - 1)(x + 2)}$

C.  $\frac{x(x - 2)}{(3x - 1)(x + 2)}$

D.  $\frac{-x(x + 2)}{(3x - 1)(x + 2)}$

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Simplify:  $\frac{4a - 28}{6} \div \frac{a^2 - 49}{3a - 21}$

A.  $\frac{2(a - 7)}{(a + 7)}$

B.  $\frac{2a - 14}{7}$

C.  $\frac{a^2 + 4a - 77}{6(3a - 21)}$

D.  $\frac{a - 8}{6(a - 7)}$

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Simplify:  $\frac{\frac{2x + 6}{x + 1}}{\frac{x + 3}{x^2 - 1}}$

A.  $2(x + 1)$

B.  $2(x - 1)$

C.  $x + 5$

D.  $x + 1$

12

4. Add:  $\frac{5}{2x - 8} + \frac{3x}{x^2 - 16}$

A.  $\frac{11x}{2(x + 4)(x - 4)}$

B.  $\frac{11x + 4}{2(x + 4)(x - 4)}$

C.  $\frac{11x + 20}{2(x + 4)(x - 4)}$

D.  $11x + 20$

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Subtract and simplify:  $\frac{2x + 8}{x^2 + 6x + 8} - \frac{x + 16}{x^2 + 8x + 12}$

A.  $\frac{x - 8}{-2x - 4}$

B.  $\frac{x - 4}{(x + 2)(x + 6)}$

C.  $\frac{x - 8}{(x + 4)(x + 6)}$

D.  $\frac{-x - 14}{(x + 2)(x + 6)}$

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Simplify:  $\frac{\left(\frac{13xy}{16x^2 - 10x}\right)}{\left(\frac{26x}{64x^2 - 25}\right)}$

A.  $\frac{4x}{8xy + 5y}$

B.  $\frac{8xy + 5y}{4x}$

C.  $\frac{4y}{8xy + 5x}$

D.  $\frac{2y}{8x + 5}$

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Free response (partial credit can be earned by showing work).

Add.

$$\frac{3}{2n + 5} + \frac{5}{3n - 1} =$$

### Free Response Math III Final Exam Released Question

16

Given the function:

$$p(x) = \frac{(x - 4)(2x + 1)}{(x + 4)(3x - 1)(x - 4)}$$

- What are the equations of the asymptotes of the function?
- Determine if there are any points of discontinuity. Explain why or why not?
- Describe the end behavior as  $x$  approaches  $-\infty$  and as  $x$  approaches  $+\infty$ .

