RATIONAL FUNCTIONS – ACTIVITY (A)

OBJECTIVE:

In this activity, students will work cooperatively in a group of four persons each (a quartet), to analyze the given rational function. Students will factor the rational functions, find their x and y intercepts and horizontal and vertical asymptotes, all also graph the function.

GIVEN: $f(x) = \frac{2x-1}{x-7}$	**NAMES:** Student 1: _____ Student 2: _____ Student 3: _____ Student 4: _____
Student 1: Find the domain of the function.	**Student 2: Find the range of the function.**
Student 3: Find the $x-intercept$ of $f(x)$.	**Student 4: Find the $y-intercept$ of $f(x)$.**

Student 1: Graph the function.

Student 2: Locate $x-intercept$ (P) on the graph.

Student 3: Identify the horizontal asymptote.

Student 4: Identify the vertical asymptote.

RATIONAL FUNCTIONS – ACTIVITY (B)

OBJECTIVE:

In this activity, students will work cooperatively in a group of four persons each (a quartet), to analyze the given rational function. Students will factor the rational functions, find their x and y intercepts and horizontal and vertical asymptotes, all also graph the function.

GIVEN:

$$f(x) = \frac{x^2+5x}{x^2+7x+10}$$

NAMES:

Student 1: _____

Student 2: _____

Student 3: _____

Student 4: _____

Student 1: Find the domain of the function.

Student 2: Find the range of the function.

Student 3: Find the $x-intercept$ of $f(x)$.

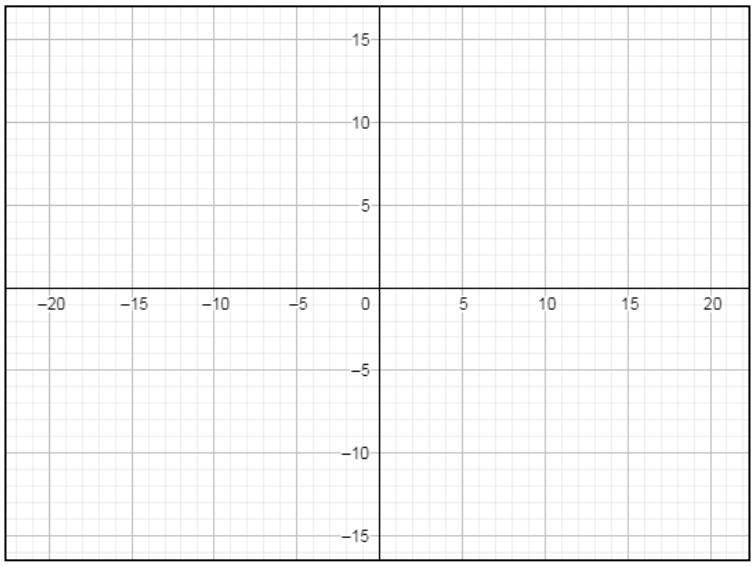
Student 4: Find the $y-intercept$ of $f(x)$.

Student 1: Graph the function.

Student 2: Locate $x-intercept$ (P) on the graph.

Student 3: Identify the horizontal asymptote.

Student 4: Identify the vertical asymptote.



RATIONAL FUNCTIONS – ACTIVITY (C)

OBJECTIVE:

In this activity, students will work cooperatively in a group of four persons each (a quartet), to analyze the given rational function. Students will factor the rational functions, find their x and y intercepts and horizontal and vertical asymptotes, all also graph the function.

GIVEN:

$$f(x) = \frac{x^2-7x+12}{x^2-9}$$

NAMES:

Student 1: _____

Student 2: _____

Student 3: _____

Student 4: _____

Student 1: Find the domain of the function.

Student 2: Find the range of the function.

Student 3: Find the $x-intercept$ of $f(x)$.

Student 4: Find the $y-intercept$ of $f(x)$.

Student 1: Graph the function.

Student 2: Locate $x-intercept$ (P) on the graph.

Student 3: Identify the horizontal asymptote.

Student 4: Identify the vertical asymptote.

RATIONAL FUNCTIONS – ACTIVITY (D)

OBJECTIVE:

In this activity, students will work cooperatively in a group of four persons each (a quartet), to analyze the given rational function. Students will factor the rational functions, find their x and y intercepts and horizontal and vertical asymptotes, all also graph the function.

GIVEN:

$$f(x) = \frac{2x^2+5x-3}{x+3}$$

NAMES:

Student 1: _____

Student 2: _____

Student 3: _____

Student 4: _____

Student 1: Find the domain of the function.

Student 2: Find the range of the function.

Student 3: Find the $x-intercept$ of $f(x)$.

Student 4: Find the $y-intercept$ of $f(x)$.

Student 1: Graph the function.

Student 2: Locate $x-intercept$ (P) on the graph.

Student 3: Identify the horizontal asymptote.

Student 4: Identify the vertical asymptote.

RATIONAL FUNCTIONS – ACTIVITY (E)

OBJECTIVE:

In this activity, students will work cooperatively in a group of four persons each (a quartet), to analyze the given rational function. Students will factor the rational functions, find their x and y intercepts and horizontal and vertical asymptotes, all also graph the function.

GIVEN: $$f(x) = \frac{x+5}{x^2+8x+15}$$	**NAMES:** Student 1: _____ Student 2: _____ Student 3: _____ Student 4: _____
Student 1: Find the domain of the function.	**Student 2: Find the range of the function.**
Student 3: Find the $x-intercept$ of $f(x)$.	**Student 4: Find the $y-intercept$ of $f(x)$.**

Student 1: Graph the function.

Student 2: Locate $y-intercept$ (P) on the graph.

Student 3: Identify the horizontal asymptote.

Student 4: Identify the vertical asymptote.

RATIONAL FUNCTIONS – ACTIVITY (A)

OBJECTIVE:

In this activity, students will work cooperatively in a group of four persons each (a quartet), to analyze the given rational function. Students will factor the rational functions, find their x and y intercepts and horizontal and vertical asymptotes, all also graph the function.

Answers

GIVEN:

$$f(x) = \frac{2x-1}{x-7}$$

NAMES:

Student 1: _____

Student 2: _____

Student 3: _____

Student 4: _____

Student 1: Find the domain of the function.

Solution: Domain = R − zero of the denominator

Zero of denominator: $x - 7 = 0 \rightarrow x = 7$

Domain = $\boldsymbol{R} - \{7\}$

Student 2: Find the range of the function.

Solution: Range = R – $f(x = 7)$

$$f(x = 7) = \lim_{x\to\infty} \frac{2-\frac{1}{x}}{1-\frac{7}{x}} = \frac{2-\frac{1}{\infty}}{1-\frac{7}{\infty}} = \frac{2-0}{1-0} = 2$$

Range = $\boldsymbol{R} - \{2\}$

Student 3: Find the $x-$ *intercept* of $f(x)$.

Solution: Set $f(x) = 0$

$\rightarrow \frac{2x-1}{x-7} = 0 \ \rightarrow 2x - 1 = 0 \rightarrow x = \frac{1}{2}$

$\boldsymbol{x - intercept} = \left(\frac{1}{2}, 0\right)$

Student 4: Find the $y-$ *intercept* of $f(x)$.

Solution: Set $x = 0$

$\rightarrow f(0) = \frac{2(0)-1}{0-7} = \frac{-1}{-7} = \frac{1}{7}$

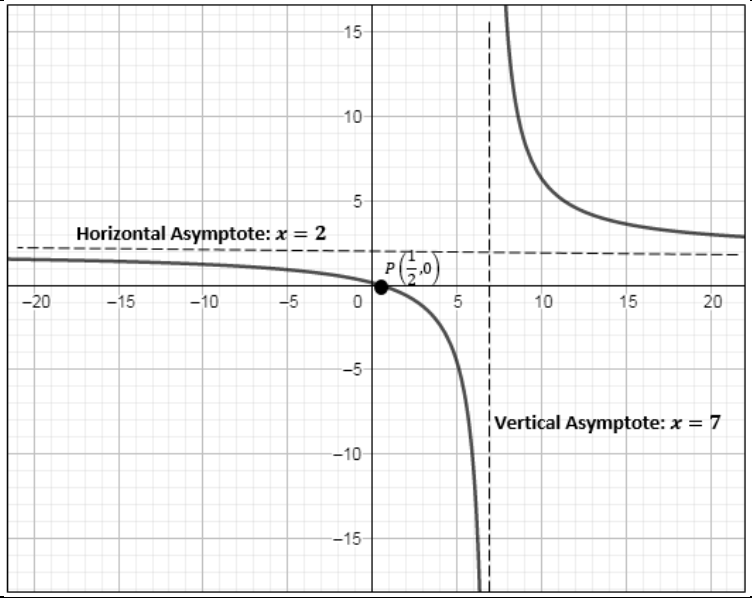
$\boldsymbol{y - intercept} = \left(0, \frac{1}{7}\right)$

Student 1: Graph the function.

Student 2: Locate $x-$ *intercept* (P) on the graph.

Student 3: Identify the horizontal asymptote.

Student 4: Identify the vertical asymptote.



RATIONAL FUNCTIONS – ACTIVITY (B)

OBJECTIVE:

In this activity, students will work cooperatively in a group of four persons each (a quartet), to analyze the given rational function. Students will factor the rational functions, find their x and y intercepts and horizontal and vertical asymptotes, all also graph the function.

Answers

GIVEN:

$$f(x) = \frac{x^2+5x}{x^2+7x+10}$$

NAMES:

Student 1: _____

Student 2: _____

Student 3: _____

Student 4: _____

Student 1: Find the domain of the function.

Solution: Domain = R − zeros of the denominator

Zeros of denominator: $x^2 + 5x + 2x + 10 = 0$

$\rightarrow (x+5)(x+2) = 0 \rightarrow x = -2\,; x = -5$

Domain = $\boldsymbol{R - \{-2, -5\}}$

Student 2: Find the range of the function.

Solution: Range = R – $\{f(x=-5), f(x=-2)\}$

$f(x) = \frac{x\cancel{(x+5)}}{\cancel{(x+5)}(x+2)} \rightarrow f(x) = \frac{x}{x+2} \rightarrow f(-5) = \frac{5}{3}$

$f(-2) = \lim_{x\to\infty} \frac{1+\frac{5}{x}}{1+\frac{7}{x}+\frac{10}{x^2}} = \frac{1+\frac{1}{\infty}}{1+\frac{7}{\infty}+\frac{10}{\infty}} = \frac{1+0}{1+0+0} = 1$

Range = $\boldsymbol{R - \{1, 5/3\}}$

Student 3: Find the $x-$ intercept of $f(x)$.

Solution: Set $f(x) = 0$

$\rightarrow \frac{x^2+5x}{x^2+7x+10} = 0 \rightarrow x(x+5) = 0 \rightarrow x = 0, -5$

Since $f(0) = 0$ and $f(-5) = \infty$

$\boldsymbol{x - intercept = (0,0)}$

Student 4: Find the $y-$ intercept of $f(x)$.

Solution: Set $x = 0$

$\rightarrow f(0) = \frac{0^2+5(0)}{0^2+7(0)+10} = \frac{0}{0+0+10} = 0$

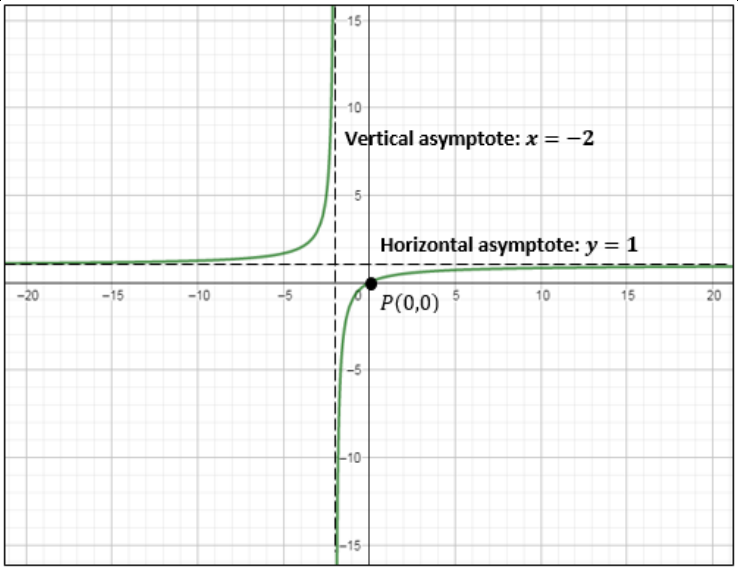
$\boldsymbol{y - intercept = (0,0)}$

Student 1: Graph the function.

Student 2: Locate $x-$ intercept (P) on the graph.

Student 3: Identify the horizontal asymptote.

Student 4: Identify the vertical asymptote.



RATIONAL FUNCTIONS – ACTIVITY (C)

OBJECTIVE:

In this activity, students will work cooperatively in a group of four persons each (a quartet), to analyze the given rational function. Students will factor the rational functions, find their x and y intercepts and horizontal and vertical asymptotes, all also graph the function.

Answers

GIVEN:

$$f(x) = \frac{x^2-7x+12}{x^2-9}$$

NAMES:

Student 1: _____

Student 2: _____

Student 3: _____

Student 4: _____

Student 1: Find the domain of the function.

Solution: Domain = R − zeros of the denominator

Zeros of denominator: $x^2 - 9 = 0$

$\rightarrow (x+3)(x-3) = 0 \rightarrow x = -3\,; x = 3$

Domain = $\boldsymbol{R - \{-3, 3\}}$

Student 2: Find the range of the function.

Solution: Range = R – $\{f(x=3), f(x=-3)\}$

$f(x) = \frac{\cancel{(x-3)}(x-4)}{\cancel{(x-3)}(x+3)} \rightarrow f(x) = \frac{x-4}{x+3} \rightarrow f(3) = -\frac{1}{6}$

$f(-3) = \lim_{x\to\infty} \frac{1-\frac{7}{x}+\frac{12}{x^2}}{1-\frac{9}{x^2}} = \frac{1-\frac{7}{\infty}+\frac{12}{\infty}}{1-\frac{9}{\infty}} = \frac{1-0+0}{1-0} = 1$

Range = $\boldsymbol{R - \left\{-\frac{1}{6}, 1\right\}}$

Student 3: Find the $x-$ *intercept* of $f(x)$.

Solution: Set $f(x) = 0$

$\rightarrow \frac{x^2-7x+12}{x^2-9} = 0 \rightarrow (x-3)(x-4) = 0$

$\rightarrow x = 3, 4$

Since $f(4) = 0$ and $f(3) = \infty$

$\boldsymbol{x - intercept = (4, 0)}$

Student 4: Find the $y-$ *intercept* of $f(x)$.

Solution: Set $x = 0$

$\rightarrow f(0) = \frac{0^2-7(0)+12}{0^2-9} = \frac{12}{-9} = -\frac{4}{3}$

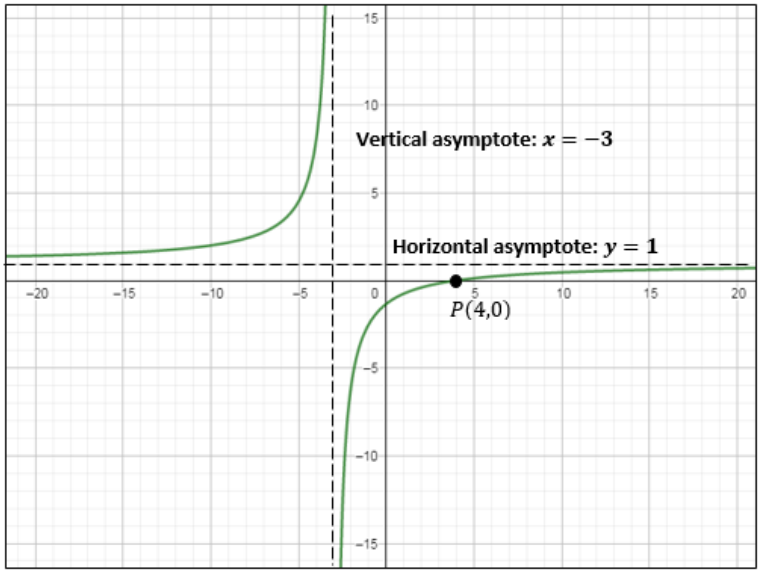
$\boldsymbol{y - intercept = \left(0, -\frac{4}{3}\right)}$

Student 1: Graph the function.

Student 2: Locate $x-$ *intercept* (P) on the graph.

Student 3: Identify the horizontal asymptote.

Student 4: Identify the vertical asymptote.



RATIONAL FUNCTIONS – ACTIVITY (D)

OBJECTIVE:

In this activity, students will work cooperatively in a group of four persons each (a quartet), to analyze the given rational function. Students will factor the rational functions, find their x and y intercepts and horizontal and vertical asymptotes, all also graph the function.

Answers

GIVEN:

$$f(x) = \frac{2x^2+5x-3}{x+3}$$

NAMES:

Student 1: _____

Student 2: _____

Student 3: _____

Student 4: _____

Student 1: Find the domain of the function.

Solution: Domain = R − zeros of the denominator

Zeros of denominator: $x + 3 = 0 \rightarrow x = -3$

Domain = $\boldsymbol{R - \{-3\}}$

Student 2: Find the range of the function.

Solution: Range = R – $\{f(x = -3)\}$

$f(x) = \frac{(2x-1)\cancel{(x+3)}}{\cancel{(x+3)}} \rightarrow f(x) = 2x - 1 \rightarrow f(-3) = -7$

Range = $\boldsymbol{R - \{-7\}}$

Student 3: Find the $x - intercept$ of $f(x)$.

Solution: Set $f(x) = 0$

$\rightarrow \frac{2x^2+5x-3}{x+3} = 0 \rightarrow (2x-1)(x+3) = 0$

$\rightarrow x = -3, ½$

Since $f\left(\frac{1}{2}\right) = 0$ and $f(-3) = \infty$

$\boldsymbol{x - intercept} = \left(\frac{1}{2}, 0\right)$

Student 4: Find the $y - intercept$ of $f(x)$.

Solution: Set $x = 0$

$\rightarrow f(0) = \frac{2(0)^2+5(0)-3}{0+3} = \frac{-3}{3} = -1$

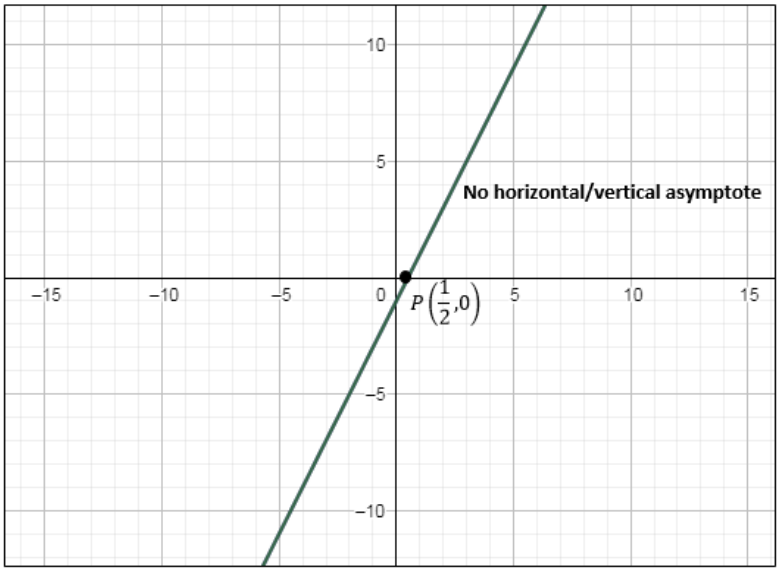
$\boldsymbol{y - intercept} = (0, -1)$

Student 1: Graph the function.

Student 2: Locate $x - intercept$ (P) on the graph.

Student 3: Identify the horizontal asymptote.

Student 4: Identify the vertical asymptote.



RATIONAL FUNCTIONS – ACTIVITY (E)

OBJECTIVE:

In this activity, students will work cooperatively in a group of four persons each (a quartet), to analyze the given rational function. Students will factor the rational functions, find their x and y intercepts and horizontal and vertical asymptotes, all also graph the function.

Answers

GIVEN:

$$\boldsymbol{f(x) = \frac{x+5}{x^2+8x+15}}$$

NAMES:

Student 1: _____

Student 2: _____

Student 3: _____

Student 4: _____

Student 1: Find the domain of the function.

Solution: Domain = R − zeros of the denominator

Zeros of denominator: $x^2 + 8x + 15 = 0$
$\rightarrow (x+3)(x+5) = 0 \rightarrow x = -3, -5$

Domain = $\boldsymbol{R - \{-3, -5\}}$

Student 2: Find the range of the function.

Solution: Range = R – $\{f(x=-3), f(x=-5)\}$

$f(x) = \frac{\cancel{(x+5)}}{\cancel{(x+5)}(x+3)} \rightarrow f(x) = \frac{1}{x+3} \rightarrow f(-5) = -\frac{1}{2}$

$f(-3) = \lim_{x\to\infty} \frac{\frac{1}{x}+\frac{5}{x^2}}{1+\frac{8}{x}+\frac{15}{x^2}} = \frac{\frac{1}{\infty}+\frac{5}{\infty}}{1+\frac{8}{\infty}+\frac{15}{\infty}} = \frac{0+0}{1+0+0} = 0$

Range = $\boldsymbol{R - \left\{-\frac{1}{2}, 0\right\}}$

Student 3: Find the $x-intercept$ of $f(x)$.

Solution: Set $f(x) = 0$
$\rightarrow \frac{x+5}{x^2+8x+15} = 0 \rightarrow (x+5) = 0$
$\rightarrow x = -5$
Since $f(-5) = \infty$
$\boldsymbol{x-intercept}$ = **does not exist**

Student 4: Find the $y-intercept$ of $f(x)$.

Solution: Set $x = 0$
$\rightarrow f(0) = \frac{0+5}{0^2+8(0)+15} = \frac{5}{15} = \frac{1}{3}$

$\boldsymbol{y-intercept = \left(0, \frac{1}{3}\right)}$

Student 1: Graph the function.

Student 2: Locate $y-intercept$ (P) on the graph.

Student 3: Identify the horizontal asymptote.

Student 4: Identify the vertical asymptote.