QUIZ 7 Review

1) Identify the appropriate description for the following rational function.

$f(x) = \dfrac{1}{x+3}$

D. The x-axis is its horizontal asymptote, and the y-axis is not its vertical asymptote.

2) Follow the steps for graphing a rational function to graph the function $R(x) = \dfrac{x+5}{x(x+8)}$.

B. R(x) cannot be factored further.

What is the domain of R(x)? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

C. $\{x | x \neq 0, -8\}$

Write R(x) in lowest terms. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

B. The graph has x-intercept(s) -5 and no y-intercept.

Determine the behavior of the graph of R at any x-intercepts. Select the correct choice below and, if necessary, fill in the answer box(es) to complete your choice.

B. The function has two vertical asymptotes. The leftmost asymptote is $x = -8$, and the rightmost asymptote is $x = 0$.

Determine the behavior of the graph on either side of any vertical asymptotes, if one exists. Select the correct choice below and, if necessary, fill in the answer box(es) to complete your choice.

C. It approaches ∞ on one side of the asymptote(s) at $x =$ $0, -8$ and $-\infty$ on the other.
(Type integers or simplified fractions. Use a comma to separate answers as needed. Type each answer only once.)

Determine the horizontal asymptote(s), if one exists. Select the correct choice below and, if necessary, fill in the answer box(es) to complete your choice.

A. The function has one horizontal asymptote, $y = 0$.
(Type an equation. Use integers or fractions for any numbers in the equation.)

Determine the oblique asymptote(s), if one exists. Select the correct choice below and, if necessary, fill in the answer box(es) to complete your choice.

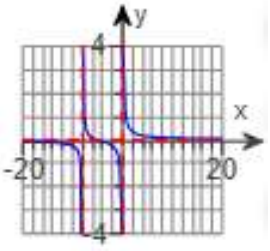
C. The function has no oblique asymptote.

Determine the points, if any, at which the graph of R intersects the horizontal or oblique asymptote, if one exists. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

A. The graph of R intersects the horizontal or oblique asymptote at $(-5,0)$.
(Simplify your answer. Type an ordered pair. Use a comma to separate answers as needed.)

Use the real zeros of the numerator and denominator of R to divide the x-axis into intervals. Determine where the graph of R is above or below the x-axis by choosing a number in each interval and evaluating R there. Select the correct choice below and fill in the answer box(es) to complete your choice.

C. The graph of R is above the x-axis on the interval(s) $(-8,-5),(0,\infty)$ and below the x-axis on the interval(s) $(-\infty,-8),(-5,0)$.
(Type your answers in interval notation. Use a comma to separate answers as neede



3) Find the real solutions of the equation.

$$x^{-2} + 9x^{-1} + 18 = 0$$

$(x + 6)(x + 3) = 0$ make fractions: $-\frac{1}{6}, -\frac{1}{3}$

4) In some cases, it is possible to solve a rational inequality simply by deciding what sign the numerator and the denominator must have and then using the rules for quotients of positive and negative numbers to determine the solution set. Use similar reasoning to solve the following inequality.

$$\frac{-8}{x^2+6} > 0$$

The solution set is ø, because you cannot factor bottom

5) Find the intercepts of the graph of the equation $y = \frac{x^2-4}{x^2-9}$.

x-intercept: factor bottom (x-3)(x+3) x = -3,3

set x = 0 to find y-intercept $\frac{0-4}{0-9} = \frac{4}{9}$

(03,0),(3,0),$(0, \frac{4}{9})$

6) Solve the equation.

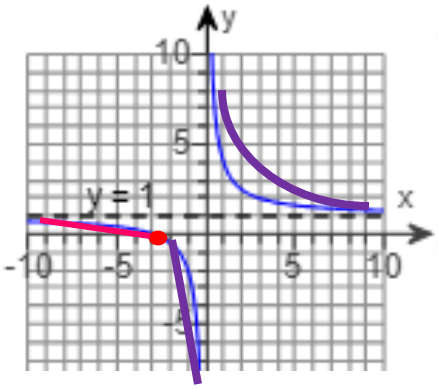
$$\frac{7}{2x-1} = \frac{4}{x+3}$$

Cross multiply: $7(x+3) = 4(2x-1)$

$7x + 21 = 8x - 4$

$x = 25$

7) The graph of a rational function $y = f(x)$ is given. Use the graph to give the solution set of the following.

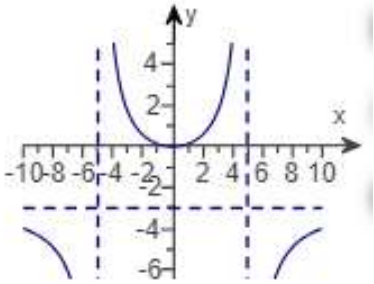


(a) $f(x) = 0$ Crosses x-axis -3

(b) $f(x) < 0$ below the x-axis (-3,0)

(c) $f(x) > 0$ above the x-axis $(-\infty,-3)\cup(0,\infty)$

8) Which rational function has the given graph?



Upside down

B. $R(x) = -\dfrac{3x^2}{x^2 - 25}$

$(x-5)(x+5)$

9) Solve the equation by making an appropriate substitution.

$$\left(x - \frac{40}{x}\right)^2 - 3\left(x - \frac{40}{x}\right) - 18 = 0$$

$u = x - \frac{40}{x}$

$u^2 - 3x - 18 = 0$

$(u - 6)(x + 3) = 0$

$u = 6, -3$

$x - \frac{40}{x} = 6$

$x^2 - 40 = 6x$

$x^2 - 6x - 40 = 0$

$(x - 10)(x + 4) = 0$

$x - \frac{40}{x} = -3$

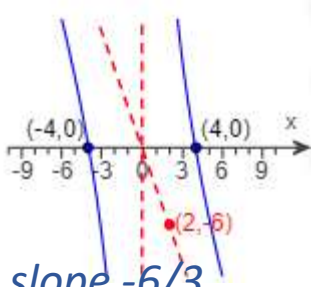
$x^2 - 40 = -3x$

$x^2 + 3x - 40 = 0$

$(x + 8)(x - 5) = 0$

$x = 10, 4, -8, 5$

10) Use the graph shown to find the following.
(a) The domain and range of the function
(b) The intercepts, if any
(c) Horizontal asymptotes, if any
(d) Vertical asymptotes, if any
(e) Oblique asymptotes, if any



use slope -6/3

(a) D: $x \neq 0$ R: all reals
(b) x=-4,4, no y
(c) none
(d) x = 0
(e) y = -3x

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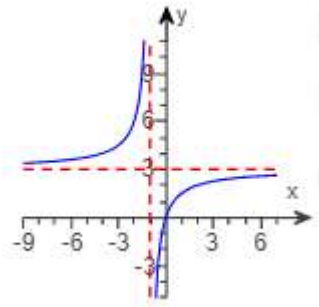

use slope -6/3

(a) D: $x \neq -1$ R: $y \neq 3$
(b) x=0, y=0
(c) y = 3
(d) x = -1
(e) none