

Chapter 9 Review

Solve the rational equations.

1.
$$\frac{5x}{x-2} = \frac{10}{x-2} + 7$$

2.
$$\frac{x-5}{-3} = \frac{4}{x+2}$$

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

4.
$$\frac{4}{x-3} + \frac{2}{x+3} = \frac{2x+2}{x^2-9}$$

5. Given $f(x) = \frac{x-2}{6}$ and $g(x) = \frac{x-2}{x-1}$, for what value(s) of x are $f(x) = g(x)$? Show the algebraic work supporting your answer.

Find the key information and sketch the graph.

6. $f(x) = \frac{-1}{x+3}$

Vertical asymptote: _____

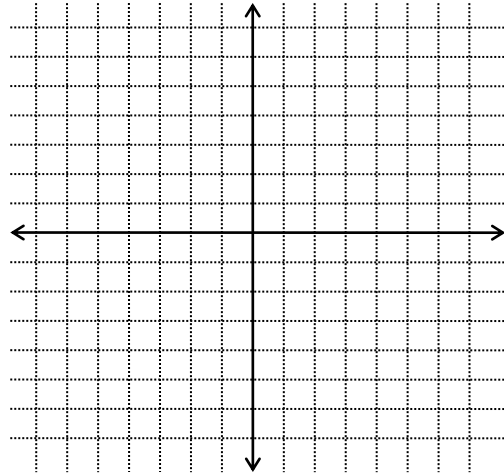
Domain: _____

Horizontal asymptote: _____

Range: _____

Reflected? _____

y-intercept: _____



Find the key information and sketch the graph.

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

Vertical asymptote: _____

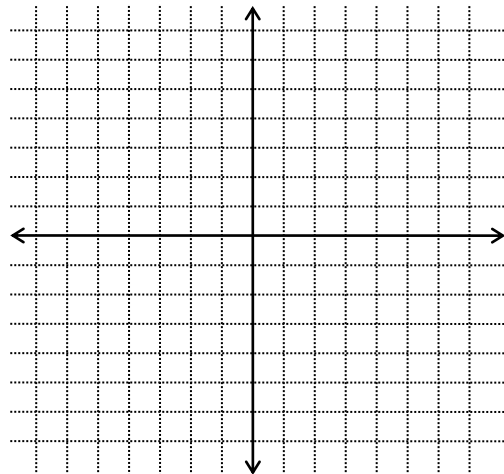
Domain: _____

Horizontal asymptote: _____

Range: _____

Reflected? _____

y-intercept: _____



Manipulate the function into the transformation form. Determine the information.

8. $f(x) = \frac{x+7}{x-2}$

Transformation form:

VA:

HA:

x-int:

y-int:

$$9. f(x) = \frac{4x-2}{x+1}$$

Transformation form:

VA:

HA:

x-int:

y-int:

Manipulate the function into standard form.

$$10. f(x) = \frac{3}{x+1} + 4$$

$$11. f(x) = \frac{2}{x-3} - 1$$

12. Find all of the key information of the function: $f(x) = \frac{4x-8}{2x+1}$

Vertical asymptote: _____

Domain: _____

Horizontal asymptote: _____

Range: _____

x-intercept: _____

y-intercept: _____

13. Compare the functions. Find the key information and write a paragraph describing similarities and differences between the two graphs. Show work! (Hint: manipulate the forms to allow easy comparison!)

$$f(x) = \frac{3}{x+1} + 2$$

$$g(x) = \frac{2x+7}{x+1}$$

14. The population density in a large city is related to the distance from the center of the city. It can be modeled by $D(x) = \frac{5000x}{x^2 + 36}$ where D is the population density (in people per square mile) and x is the distance (in miles) from the center of the city.

a) Find the population density 10 miles from the center of the city.

b) Find the population density 20 miles from the center of the city.

c) What is the average rate of change in the population density as the number of miles from the center increases from 10 miles to 20 miles?

d) Interpret the average rate of change found in part (c) in the context of this problem.

15. Suppose the cost per ton, $C(x)$, to build an oil platform of x thousand tons is approximated by

$$C(x) = \frac{312500}{x+625}.$$

a) What is the cost per ton for 30 thousand tons?

b) What is the cost per ton for 50 thousand tons?

c) How many thousand tons was the platform if the cost per ton was \$483?

d) What is the average rate of change in the cost per ton as the number of tons increases from 30 thousand tons to 50 thousand tons?

e) What is the horizontal asymptote and what does it mean in the context of this problem?

Perform the indicate operation.

$$16) \frac{3x^2y^3}{10xy^5} \cdot \frac{25y^4}{12xy}$$

$$17) \frac{x^2 - 9}{x^2 + 4x - 21} \cdot \frac{x^2 - 2x - 35}{x^2 + 8x + 15}$$

$$18) \frac{x^2 - 4}{x^2 + x - 6} \div \frac{x^2 - 2x - 8}{x + 3}$$