Study Guide for Unit 5
SpringBoard

Name Key

Date _____ Period _____

Add. Determine any values that make the expression undefined.

1. $\frac{6}{x^2+4x-32} + \frac{(x-5)}{(x-4)}\frac{(x+8)}{(x+8)} = \frac{6+x^2+3x-40}{(x-4)(x+8)}$

$= \boxed{\frac{x^2+3x-34}{(x-4)(x+8)}, \quad x \neq 4, -8}$

Divide. Assume that all expressions are defined.

2. $\frac{8x^2+6x+1}{8x^2+14x+3} \div \frac{2x+1}{x^2+4x}$

$\frac{(2x+1)(4x+1)}{(4x+1)(2x+3)} \cdot \frac{x(x+4)}{2x+1} = \boxed{\frac{x(x+4)}{2x+3}}$

Solve.

3. $\frac{x}{x-3} + \frac{x}{3} = \frac{6x}{2x-6}$ $\quad x \neq 3$

$\frac{x}{3} = \frac{6x}{2x-6} - \frac{2x}{2x-6}$

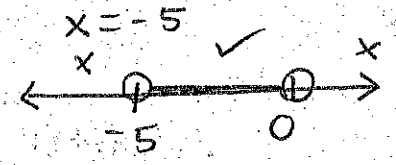
$\frac{x}{3} = \frac{4x}{2x-6}$

$\boxed{x = 0, 9}$

4. $\frac{x-5}{x} > 2$ $\quad x \neq 0$

$x - 5 = 2x$

$x = -5$ ✓



$\boxed{(-5, 0)}$

5. $\sqrt{3x+13} + 3 = 2x$

$\sqrt{3x+13} = 2x - 3$

$3x + 13 = 4x^2 - 12x + 9$

$0 = 4x^2 - 15x - 4$

$0 = (4x+1)(x-4)$

$x = -1/4, 4$

$\boxed{x = 4}$

Describe the transformations and graph the function. State the domain and range.

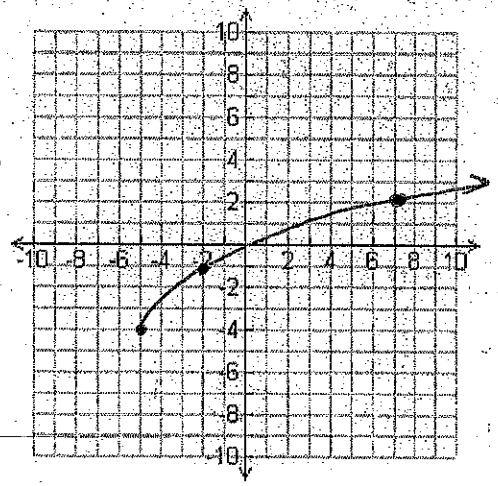
6. $g(x) = \sqrt{3(x+5)} - 4$

Horizontal compression by 1/3

Translated left 5, down 4

D: $x \geq -5$

R: $y \geq -4$



x	y
-5	-4
-2	-1
7	2

7. Given $f(x) = \frac{x^2+6x-7}{x^2-x}$. Identify any zeros, asymptotes, or holes in the graph.

$= \frac{x+7}{x}$

Hole: $x = 1$

VA: $x = 0$

HA: $y = 1$

zero: $x = -7$

8. Given $g(x) = \frac{x^2-4x+3}{x-5}$. Identify any zeros, asymptotes, or holes in the graph.

NO Holes

VA: $x = 5$

HA: None

zeros: $x = 3, 1$

9. Create a sample function based on the following descriptions.

a) The parent function $y = \sqrt{x}$ has been horizontally compressed by ¾, translated right 5 and translated up 6.

$y = \sqrt{\frac{4}{3}(x-5)} + 6$

b) A rational function has a horizontal asymptote of y = 4, a hole at x = 5, and a vertical asymptote of x = -3.

Sample:

$y = \frac{4x(x-5)}{(x+3)(x-5)}$ OR $y = \frac{x-5}{(x+3)(x-5)} + 4$

10. The current of a river is moving at 2 mph. Your canoe travels 9 mi downstream and then travels 5 mi upstream. The speed of your canoe in still water is C miles per hour.

(A) Write an equation that would represent the time traveled downstream and upstream. T = total time

$T = \frac{9}{c+2} + \frac{5}{c-2}$

(B) Using the equation in (A), determine the rate of the canoe in still water when the total time traveled was 7 hours.

$7 = \frac{9}{c+2} + \frac{5}{c-2}$

$7 = \frac{9(c-2)+5(c+2)}{c^2-4}$

$7c^2 - 28 = 14c - 8$

$7c^2 - 14c - 20 = 0$

$c = \frac{7 \pm \sqrt{21}}{7}$

11. Solve: $2x^{3/2} - 75 = 175$

$2x^{3/2} = 250$

$x^{3/2} = 125$

$x = 125^{2/3} = \boxed{25}$