 Name: KEY

Unit 5 Review

Solve algebraically the following rational equations

$\frac{(x-3)}{(x-3)}\frac{2x}{x-1}+\frac{1}{x-3}=\frac{2}{(x-1)(x-3)}$ $x\neq 1,3$

$\frac{2x^2-6x+x-1}{(x-3)(x-1)}=\frac{2}{(x-1)(x-3)}$

$2x^2-5x-1=2$

$2x^2-5x-3=0$

$(x-3)(2x+1)=0$

$x=3,\ -\frac{1}{2}$

$\boxed{x=-\frac{1}{2}}$

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

$2(x+2)$ $2(x+2)$

$\frac{6+3}{2(x+2)}=\frac{x}{2(x+2)}$

$\boxed{x=9}$

$\frac{6}{3}\cdot\frac{x+1}{3x-6}=\frac{5x}{6}\cdot\frac{3(x+1)}{3(x-2)}\cdot\frac{10}{10}$ $x\neq 2$

$3(x-2)$

$\frac{6x+6}{10(x-2)}=\frac{15x^2-30x}{10(x-2)}+\frac{10}{10(x-2)}$

$15x^2-12=6x+16$

$15x^2-6x-18=0$

$15x^2-30x+18=6x+6$

$-6x-6\quad -6x-6$

$15x^2-36x+12=0$

$3(x-2)(5x-2)=0$

$x=2,\ 2/5$

$\boxed{x=2/5}$

Multiply or divide the following rational expressions and find the excluded vales.

4. Divide $\frac{x+2}{x-4}\div\frac{x}{3x-12}$

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

$=\boxed{\frac{3(x+2)}{x}\quad x\neq 0,4}$

5. Multiply $\frac{x^2-4x-5}{3x-15}\cdot\frac{4}{x^2-2x-3}$

$=\frac{(x-5)(x+1)}{3(x-5)}\cdot\frac{4}{(x-3)(x+1)}$

$=\boxed{\frac{4}{3(x-3)}\quad x\neq 5,3,-1}$

6. Multiply $\frac{3x+6}{x+2}\cdot\frac{x-3}{x-4}$

$3(x+2)$

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

$\boxed{\frac{3(x-3)}{x-4}\quad x\neq -2,4}$

7. Divide $\frac{x+3}{x+2}\div\frac{x^2-9}{2x-4}$

$=\frac{x+3}{x+2}\cdot\frac{2(x-2)}{(x+3)(x-3)}$

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

Secondary III Unit 5 Review Name:_____

Add or subtract the following expressions, simplify the results, and note the excluded values.

8. $\frac{4}{x^2-1} - \frac{x+2}{x-1}\frac{(x+1)}{(x+1)}$

$(x+1)(x-1)$

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

$= \frac{4-(x^2+3x+2)}{(x+1)(x-1)} = \boxed{\frac{-x^2-3x+2}{(x+1)(x-1)}} \quad x \neq 1, -1$

9. $\frac{6x+6}{x^2-9} + \frac{-3x+3}{x^2-9} =$

$= \frac{3x+9}{x^2-9} = \boxed{\frac{3x+9}{(x+3)(x-3)} \quad x \neq -3, 3}$

10. $\left(\frac{x}{x}\right)\frac{1}{3+x} + \frac{3-x}{x}\left(\frac{x+3}{x+3}\right)$

$= \frac{x+(x+3)(3-x)}{x(3+x)} = \frac{x+3x-x^2+9-3x}{x(x+3)}$

$= \boxed{\frac{-x^2+x+9}{x(x+3)} \quad x \neq 0, -3}$

11. $\frac{4}{x^2-1} - \frac{x+2}{x-1}\frac{(x+1)}{(x+1)} = \frac{4-(x+2)(x+1)}{(x+1)(x-1)}$

$(x+1)(x-1)$

$= \frac{4-(x^2+3x+2)}{(x+1)(x-1)} = \boxed{\frac{-x^2-3x+2}{(x+1)(x-1)} \quad x \neq 1, -1}$

Find the LCD of the following rational equations:

12. $\frac{5}{x^2-3x+2} - \frac{1}{x-2} = 0$

$(x-2)(x-1)$

LCD: $(x-2)(x-1)$

13. $\frac{x+2}{x} - \frac{4}{x-1} + \frac{2}{x^2-x} = 0$

$x(x-1)$

LCD: $x(x-1)$

Find the inverse of the following expressions.

14. $f(x) = \frac{x}{x-3}$

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

$x(y-3) = y$

$xy-3x = y$

$xy-y = 3x$

$y(x-1) = 3x$

$\boxed{f^{-1}(x) = \frac{3x}{x-1}}$

15. $f(x) = \frac{x+6}{5}$

$x = \frac{y+6}{5}$

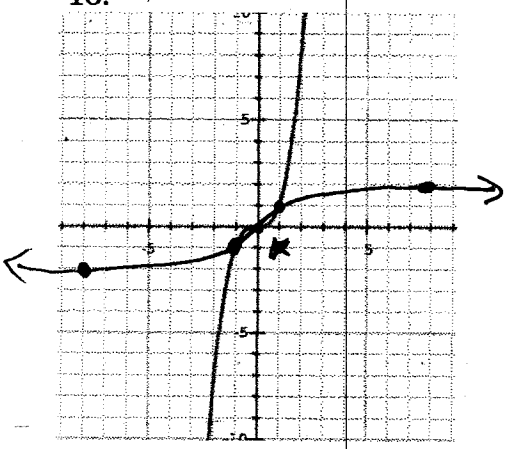
$5x = y+6$

$5x-6 = y$

$\boxed{f^{-1}(x) = 5x-6}$

Determine whether the function is one-to-one. If so, graph the inverse on the same graph. Label at least two points on the inverse.

16.



Yes 1-1

17. A restaurant has two pastry ovens. When both ovens are used, it takes about 3 hours to bake the bread needed for one day. When only the large oven is used, it takes about 4 hours to bake the bread for one day. About how long would it take to bake the bread for one day if only the small oven were used? Explain how you got your answer.

$\frac{3x}{3x}\cdot\frac{1}{4} + \frac{1}{x}\cdot\frac{12}{12} = \frac{1}{3}\cdot\frac{4x}{4x}$

$3x+12 = 4x$

$3x+12 = 4x$

$-12x \quad -12x$

$x = 12$

small oven takes 12 hours

18. Kelsey is kayaking on a river. She travels 5 miles upstream and 5 miles downstream in a total of 6 hours. In still water, Kelsey can travel at an average speed of 3 miles per hour. What is the average speed of the river's current?

	D =	r •	t
up	5		
down	5		

19. Given the zeros x=-2*i* and 5(multiplicity 3), write a function in standard form.

$f(x) = (x+2i)(x-2i)(x-5)^3$

$= x^2 - 2xi + 2xi - 4i^2$

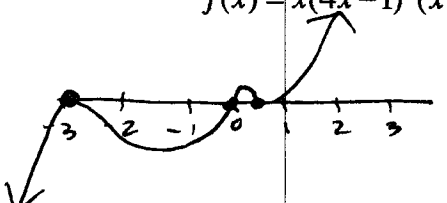
$= (x^2+4)(x^3-15x^2+75x-125)$

$= x^5 - 15x^4 + 75x^3 - 125x^2 + 4x^3 - 60x^2 + 300x - 500$

$f(x) = x^5 - 15x^4 + 79x^3 - 185x^2 + 300x - 500$

20. Describe the end behavior of f(x) using limits as $x \to -\infty$ and as $x \to \infty$:

$f(x) = x(4x-1)^2(x+3)^4$



$\lim_{x\to-\infty} f(x) = -\infty$

$\lim_{x\to\infty} f(x) = \infty$

21. Use the given zero to find all the zeros of the function

$1+i,\ f(x) = x^4 - 2x^3 - x^2 + 6x - 6$

1+i	1	-2	-1	6	-6
		1+i	-2	-3-3i	6
1-i	1	-1+i	-3	-3+3i	0
		1-i	0	-3+3i	
	1	0	-3	0	

$x^2 - 3 = 0$

$x^2 = 3$

$x = \pm\sqrt{3}$

$(1+i)(-1+i) = -1+i^2 = -2$

$(1+i)(3-3i) = 3 - 3i + 3i - 3i^2 = 3 - 3(-1)$

Zeros: $x = \pm\sqrt{3}, 1+i, 1-i$