

Unit 5 - 1st Semester Final Review Worksheet

Rational Functions

Show all work on separate sheets of paper

Name: _____

Date: _____ Per: _____

Simplify and state any excluded values.

1. $\frac{3x-15}{5-x}$

2. $\frac{x^2-2x}{x^2-7x+10}$

3. $\frac{2x^2-32}{x^3-64}$

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

Multiply or divide and simplify completely.

5. $\frac{x^2-3x-10}{x^2-4x+4} \cdot \frac{4x-8}{2x-10}$

6. $\frac{2x^2-18}{x^2-x-2} \div \frac{10x-30}{x^2+x-6}$

7. $\frac{3x+2}{5x^2-x} \cdot \frac{10x^2+3x-1}{6x^2+x-2}$

8. $\frac{x^3+27}{x^2-9} \div \frac{5x^2-17x+6}{10x-4}$

Add or subtract and simplify completely.

9. $\frac{4x-15}{x^2+5x-24} + \frac{3}{x^2+5x-24}$

10. $\frac{10x}{x+1} - \frac{6x-4}{x+1}$

11. $\frac{6x}{x-2} + \frac{12}{2-x}$

12. $\frac{x}{x-2} + \frac{7}{x-3}$

13. $\frac{2}{x+1} - \frac{3}{x+4}$

14. $\frac{4x}{2x+6} + \frac{6}{x+3}$

15. $\frac{4}{x-3} - \frac{3x-5}{x^2-9}$

Solve for x . Check for extraneous solutions.

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

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

18. $\frac{2}{x-1} + \frac{2}{x+2} = \frac{6}{x^2+x-2}$

19. A group of friends decide to rent a car that costs \$80 and to divide the cost evenly among the friends. Initially there are x friends, but then one more friend decides to join the group, causing each friend to pay \$4 less.

- a) Create an equation that represents the situation and can be used to solve for x , the initial number of friends.
 b) Use the equation you created in part a) to solve for x , the initial number of friends.

20. Daniela can clean the kitchen in 12 minutes. Nick can clean the same kitchen in 16 minutes.

- a) Write an equation that can be used to find the time t , in minutes, it would take Daniela and Nick to clean the kitchen if they work together.
 b) Solve the equation for t that you wrote in part a)

For problems 21 and 22, do all of the following:

- a) Sketch the graph of f .
 b) Find the y -intercept of f .
 c) Find the x -intercept of f .
 d) State the domain of f .
 e) State the range of f .
 f) State the equation(s) of any vertical asymptotes of f .
 g) State the equation(s) of any horizontal asymptotes of f .
 h) State the interval(s) on which the graph of f is increasing?
 i) State the interval(s) on which the graph of f is decreasing?
 j) State the interval(s) on which the graph of f is greater than zero?
 k) State the interval(s) on which the graph of f is less than zero

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

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

For problems 23 and 24, state the equations of any horizontal and vertical asymptotes of each function. Then state the domain and range of each function.

23. $g(x) = \frac{3}{x+5} - 2$

24. $h(x) = \frac{-3}{x-4} + 1$