

HW21: Unit 2 Test Review #1

Determine the excluded values.

1. $\frac{7x}{x-8}$

2. $\frac{2x^2}{x^2+4x-12}$

3. $\frac{x-2}{x^2-16}$

4. $\frac{x}{2x-6}$

Simplify each rational expression. State the excluded values.

5. $\frac{x^2-4x-12}{x^2-4}$

6. $\frac{x^2-3x+2}{x^2+5x-6}$

7. $\frac{x^2+6x+9}{x^2-4} \cdot \frac{x-2}{x+3}$

8. $\frac{x-3}{2x-8} \cdot \frac{6x^2-96}{x^2-9}$

9. $\frac{x^2-24x+144}{2x-24} \div \frac{11x-132}{22}$

10. $\frac{5x^2+10x}{x^2-x-6} \div \frac{15x^3+45x^2}{x^2-9}$

$$11. \frac{x}{x^2-16} - \frac{6}{x^2+5x+4}$$

$$12. \frac{7}{5x} - \frac{3x+2}{x+2}$$

$$13. \frac{x-2}{5x^2-5x} - \frac{3x+2}{x^2+4x-5}$$

$$14. \frac{\frac{x}{x-6}}{\frac{27}{x^2-36}}$$

$$15. \frac{\frac{2}{x+2}}{\frac{3x+4}{x^2+2x}}$$

$$16. \frac{\frac{1}{x^3+64}}{x^2-16}$$

Solve each equation.

$$17. \frac{1}{x-1} + 5 = \frac{11}{x-1}$$

$$18. \frac{3}{x+3} = \frac{5}{2x+6} + \frac{1}{x-2}$$

$$19. \frac{x}{2x+2} = \frac{-2x}{4x+4} + \frac{2x-3}{x+1}$$

$$20. \frac{4}{x+2} + \frac{2}{x-4} = \frac{30}{x^2 - 2x - 8}$$

21. In the Mississippi River near New Orleans, the Creole Queen paddleboat travels 4 miles upstream in the same amount of time it travels 6 miles downstream. If the current of the river is 2 miles per hour, determine the speed of the Creole Queen in still water.

22. A car can travel 300 miles in the same amount of time it takes a bus to travel 180 miles. If the average speed of the bus is 20 miles per hour slower than the speed of the car, find the speed of each.

23. John can pack up the room in 4 hours. When John and Mark work on packing together, it takes them 3 hours. How long would it take Mark to pack the room all by himself?

Solve. Check for extraneous solutions.

24. $\sqrt{x+10} = x-2$

25. $\sqrt{x-3} + 9 = 5$

26. $x = \sqrt{72-x}$

Divide.

$$27. \frac{3x^4 + 5x^3 - 2x + 2}{x + 2}$$

$$28. \frac{x^4 + 2x^3 - 4x^2 - 5x - 6}{x^2 + x - 2}$$

$$29. \frac{2x^3 - 11x + 3}{x - 2}$$

30. Given $f(x) = 2x^3 - 5x^2 + x + 2$, find $f(-1)$.

Answers

1. $x \neq 8$
2. $x \neq -6, 2$
3. $x \neq -4, 4$
4. $x \neq 3$
5. $\frac{x-6}{x-2}$, $x \neq -2, 2$
6. $\frac{x-2}{x+6}$, $x \neq -6, 1$
7. $\frac{x+3}{x+2}$, $x \neq -3, -2, 2$
8. $\frac{3(x+4)}{x+3}$, $x \neq -3, 3, 4$
9. 1, $x \neq 12$
10. $\frac{1}{3x}$, $x \neq -2, -3, 0, 3$
11. $\frac{x^2 - 5x + 24}{(x-4)(x+4)(x+1)}$, $x \neq -4, -1, 4$
12. $\frac{-15x^2 - 3x + 14}{5x(x+2)}$; $x \neq -2, 0$
13. $\frac{-14x^2 - 7x - 10}{5x(x-1)(x+5)}$, $x \neq -5, 0, 1$
14. $\frac{x(x+6)}{27}$, $x \neq -6, 6$
- 15. $\frac{2x}{3x+4}$, $x \neq -2, 0, \frac{-4}{3}$
16. $\frac{(x-4)}{5(x^2 - 4x + 16)}$, $x \neq -4, 4$
17. $x = 3$
18. $x = -8$
19. $x = 3$
20. $x = 7$
21. 10 mph
22. car – 50 mph, bus – 30 mph
23. 12 hours
24. $x = 6$
25. No solution
26. $x = 8$
27. $3x^3 - x^2 + 2x - 6 + \frac{14}{x+2}$
28. $x^2 + x - 3 - \frac{12}{x^2 + x - 2}$
29. $2x^2 + 4x - 3 - \frac{3}{x-2}$
30. $f(-1) = -6$