

Worksheet 1.4.2: Problem Solving Involving Rational Algebraic Expressions

A. Rational Equation or Rational Expression

Write Rational Equation if the statement is a rational equation or Rational Expression if it is a rational expression. One point each.

1. $\frac{2x}{5x + 4} = \frac{6x}{2x + 3}$

4. $\frac{7}{3} = \frac{8}{12x - 8}$

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

5. $\frac{2}{x + 2}$

3. $\frac{6}{x - 1} = \frac{5x}{4}$

B. Solving Rational Equations

Solve each rational equation. Choose the answer from the box. Answers may be repeated. Write the letter only. One point each.

a. 3	f. $\frac{5}{4}$
b. -20	g. -2
c. -4	h. 1
d. -5	i. $\frac{1}{3}$
e. $-\frac{17}{5}$	j. -1

6. $\frac{1}{4x} - \frac{1}{4} = \frac{1}{2}$

11. $\frac{n - 1}{2n} = 1 + \frac{1}{2n}$

7. $\frac{5v - 5}{v} - \frac{5v + 15}{v} = 1$

12. $\frac{5}{k} = \frac{1}{k} - 1$

8. $\frac{5a + 20}{6a} + \frac{1}{a} = \frac{3}{2a}$

13. $\frac{5}{b} = \frac{1}{b} + 4$

9. $\frac{2}{m^2} = \frac{1}{m} + \frac{1}{m^2}$

14. $\frac{4}{n + 1} - \frac{1}{n^2 + 7n + 6} = \frac{3}{n^2 + 7n + 6}$

10. $1 + \frac{4}{r - 2} = \frac{5}{r - 2}$

15. $\frac{1}{r - 1} + 4 = \frac{2}{r - 1}$

C. Problem Solving

Solve each problem completely. Choose the answer from the box. Write the letter only. One point each.

a. $\frac{24}{5}$	f. 6
b. 1	g. $\frac{40}{3}$
c. $\frac{270}{7}$	h. 30
d. 60	i. $\frac{1}{15}$
e. $\frac{12}{5}$	j. 33

16. Mario needs 4 hours to complete a work. His friend Juvan needs 6 hours to complete the same work. How long will it take to complete if they work together?

17. The ratio of girls to boys at Maria's school is 2 : 3. If there are 22 girls at Maria's school, how many boys are there?
18. Suppose one painter can paint the entire house in twelve hours, and the second painter takes eight hours to paint a similarly-sized house. How long would it take the two painters together to paint the house?
19. Wilma can mow the lawn in 3 hours. If Kyle helps her with another mower, the lawn can be mowed in 2 hours. How long would it take Kyle if he worked alone?
20. The ratio of an angle to its complement is $\frac{3}{4}$. Find the angle.
21. Find a number which when added to both the numerator and denominator of $\frac{2}{5}$ will make the fraction equal to $\frac{1}{2}$.
22. When 10 is subtracted from the reciprocal of a number, the result is 5. What is the number?
23. Jessica can do her project in 20 minutes and Michelle can do the same work in 40 minutes. How long will it take them to finish the same work if they work together?
24. The sum of $\frac{1}{5}$ of a certain number and $\frac{1}{3}$ of the same number is 32. Find the number.
25. A filler pipe can fill a tank in 10 hours, while an outlet pipe can empty the tank in 15 hours. How long would it take to fill the empty tank with both pipes operating?