

**ANSWER SHEET**

Instructions: Place your answers to all problems on this sheet. Attach your work for the problems on the back. If answer doesn't fit on the answer sheet and is on your solution paper, indicate that in the answer slot below by writing "on solution paper".

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Worksheet: \_\_\_\_\_

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Solve the problems on a separate sheet of paper. Also, write your answers on the answer sheet.

Section 7-1 – Fundamental Property of Rational Expressions

Find the numerical value of each expression when  $x = -3$ .

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

Find all values for which the following expressions are undefined.

3.  $\frac{4x+3}{x^2+x-12}$                       4.  $\frac{x+5}{x^3+9x^2+18x}$

Write each rational expression in lowest terms.

5.  $\frac{15ab^3c^9}{-24ab^2c^{10}}$                       6.  $\frac{(b^2+2b-15)}{b^2+9b+20}$                       7.  $\frac{vw-5v+3w-15}{vw-5v-2w+10}$

Write four equivalent forms of the following rational expression.

8.  $\frac{4x+1}{5x-3}$                       9.  $-\frac{2x+6}{x-5}$

Section 7.2 – Multiplying and Dividing Rational Expressions

Multiply. Write each answer in lowest terms.

10.  $\frac{6}{9y+36} \cdot \frac{4y+16}{9}$                       11.  $\frac{3x^2-12}{x^2-x-6} \cdot \frac{x^2-6x+9}{2x-4}$                       12.  $\frac{m^2-16}{m-3} \cdot \frac{m^2-9}{m+4}$

Divide. Write each answer in lowest terms.

13.  $\frac{6z^3}{9zw} \div \frac{z^7}{21zw^2}$                       14.  $\frac{9a^2-1}{9a^2-6a+1} \div \frac{3a^2-11a-4}{12a^2+5a-3}$

Section 7.3 – Least Common Denominators

Find the Least Common Denominators for each list of expressions.

15.  $\frac{15}{7t-28}, \frac{21}{6t-24}$                       16.  $\frac{v-4}{3v^4-6v^3}, \frac{v+2}{v^2+2v-8}$                       17.  $\frac{17r}{9r^2-6r-8}, \frac{-13r}{9r^2-9r-4}$

Rewrite each rational expression with the indicated denominator. Give the numerator of the new fraction.

18.  $\frac{8z}{3z+3} = \frac{?}{12z^2+15z+3}$                       19.  $\frac{3}{k^2+3k} = \frac{?}{k^3+10k^2+21k}$

Section 7.4 – Adding and Subtracting Rational Expressions

Find each sum. Write each answer in lowest terms.

20.  $\frac{x}{x^2-4} + \frac{7x}{x^2-4}$                       21.  $\frac{2x}{9x^2-25y^2} + \frac{x-5y}{9x^2-25y^2}$

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Find each sum. Write each answer in lowest terms.

22.  $\frac{3z-2}{5z+20} + \frac{2z+1}{3z+12}$

23.  $\frac{5p-2}{2p^2+9p+9} + \frac{p+7}{6p^2+13p+6}$

Find each difference. Write each answer in lowest terms.

24.  $\frac{2x}{x^2+3x-10} - \frac{x+2}{x^2+3x-10}$

25.  $\frac{m}{m^2-4} - \frac{1-m}{m^2+4m+4}$

26.  $\frac{3}{n^2-16} - \frac{6n}{n^2+8n+16}$

Section 7.5 – Complex Fractions

Simplify each complex fraction by writing it as a division problem.

27.  $\frac{\left(\frac{3}{4} - \frac{1}{2}\right)}{\left(\frac{1}{4} + \frac{5}{8}\right)}$

28.  $\frac{\frac{2}{a+2} - 4}{\frac{1}{a+2} - 3}$

Simplify each complex fraction by multiplying by the least common denominator.

29.  $\frac{\frac{a^2}{b}}{\frac{a^2}{b^2}}$

30.  $\frac{\frac{15}{10k+10}}{\frac{5}{3k+3}}$

Section 7.6 Solving Equations with Rational Expressions

Solve the equations.

31.  $\frac{3x}{5} - \frac{4x}{3} = \frac{22}{15}$

32.  $\frac{9}{x^2-x-12} = \frac{3}{x-4} - \frac{x}{x+3}$

Section 7.7 – Applications of Rational Expressions

Solve each problem.

33. The sum of a number and its reciprocal is  $\frac{13}{6}$ . Find the number.

34. A boat goes 6 miles per hour in still water. It takes as long to go 40 miles upstream as 80 miles downstream. Find the speed of the current.

35. Nina can wash the walls in a certain room in 2 hours and Mark can wash these walls in 5 hours. How long would it take them to complete the task if they work together?

Section 7.8 – Variation

Solve each problem.

36. If  $y$  varies directly as  $x$ , and  $y = 20$  when  $x = 2$ , find  $y$  when  $x = 5$ .

37. If  $w$  varies directly as the square of  $v$ , and  $w = 24$  when  $v = 6$ , find  $w$  when  $v$  is 10.

38. If  $t$  varies inversely as  $r$ , and  $t = 4$  when  $r = 60$ , find  $t$  when  $r = 45$ .

39. If  $y$  varies inversely as the square of  $x$ , and  $y = 12$  when  $x = 3$ , find  $y$  when  $x$  is 5.