

Math 1010 – Intermediate Algebra

Summary Exercises on Rational Expressions & Equations

Name _____

Score _____

A common student error is to confuse an equation, such as $\frac{x}{2} + \frac{x}{3} = -5$, with an expression involving an operation, such as $\frac{x}{2} + \frac{x}{3}$. **Equations are solved for a numerical answer, while problems involving operations result in simplified expressions.**

Solving an Equation	Simplifying an Expression Involving an Operation
<p>Solve:</p> $\frac{x}{2} + \frac{x}{3} = -5$ <p>Multiply each side by the LCD, 6. <i>(or wipe out)</i></p> $6\left(\frac{x}{2} + \frac{x}{3}\right) = 6(-5)$ $6\left(\frac{x}{2}\right) + 6\left(\frac{x}{3}\right) = 6(-5)$ $3x + 2x = -30$ $5x = -30$ $x = -6$ <p>Check that the solution set is $\{-6\}$.</p>	<p>Add:</p> $\frac{x}{2} + \frac{x}{3}$ <p>Write both fractions with the LCD, 6.</p> $= \frac{x \cdot 3}{2 \cdot 3} + \frac{x \cdot 2}{3 \cdot 2}$ $= \frac{3x}{6} + \frac{2x}{6}$ $= \frac{3x + 2x}{6}$ $= \frac{5x}{6}$

Work each problem on another sheet of paper. For each exercise, indicate “**expression**” if an expression is to be simplified or “**equation**” if an equation is to be solved. Then simplify the expression or solve the equation as appropriate.

1) $\frac{4}{p} + \frac{6}{p}$

2) $\frac{x^3y^2}{x^2y^4} \cdot \frac{y^5}{x^4}$

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

4) $\frac{8}{m - 5} = 2$

5) $\frac{2k + \frac{5}{k-1}}{3k - \frac{2}{k}}$

6) $\frac{x^{-1} + y^{-1}}{x^{-1} - y^{-1}}$

7)
$$\frac{x-4}{5} = \frac{x+3}{6}$$

8)
$$\frac{3t^2 - t}{6t^2 + 15t} \div \frac{6t^2 + t - 1}{2t^2 - 5t - 25}$$

9)
$$\frac{4}{p+2} + \frac{1}{3p+6}$$

10)
$$\frac{1}{x} + \frac{1}{x-3} = \frac{-5}{4}$$

11)
$$\frac{x^3 - 8}{x^4 - 16} \div \frac{x^2 + 2x + 4}{5x^2 + 13x + 6}$$

12)
$$\frac{2}{x+1} + \frac{5}{x-1} = \frac{10}{x^2 - 1}$$

13)
$$\frac{3}{t-1} + \frac{1}{t} = \frac{7}{2}$$

14)
$$\frac{m^{-1} + p^{-2}}{2m^{-2} - p^{-1}}$$

15)
$$\frac{5}{4z} - \frac{2}{3z}$$

16)
$$\frac{x+2}{3} = \frac{2x-1}{5}$$

17)
$$\frac{2}{k^2 - 4k} + \frac{3}{k^2 - 16}$$

18)
$$\frac{2y^2 - 3y}{20y^2 - 5y} \div \frac{2y^2 - 5y + 3}{4y^2 + 11y - 3}$$

19)
$$\frac{y+4}{y^2 - 3y + 2} - \frac{5}{y^2 - 4y + 3} = \frac{y-4}{y^2 - 5y + 6}$$

20)
$$\frac{\frac{5}{x} - \frac{3}{y}}{\frac{9x^2 - 25y^2}{x^2y}}$$

21)
$$\frac{4x^2 - x}{6x^2 + 10x} \div \frac{8x^2 + 2x - 1}{3x^2 + 11x + 10}$$

22)
$$\frac{x}{x-2} + \frac{3}{x+2} = \frac{8}{x^2 - 4}$$

23)
$$\frac{1}{m^2 + 5m + 6} + \frac{2}{m^2 + 4m + 3}$$

24)
$$\frac{3}{x+3} + \frac{4}{x+6} = \frac{9}{x^2 + 9x + 18}$$

25)
$$\frac{\frac{6}{x+1} - \frac{1}{x}}{\frac{2}{x} - \frac{4}{x+1}}$$

26)
$$\frac{2y^2 + y - 6}{2y^2 - 9y + 9} \cdot \frac{y^2 - 2y - 3}{y^2 - 1}$$