NAME _____ DATE _____ PERIOD _____

8-2 Practice

Adding and Subtracting Rational Expressions

Find the LCM of each set of polynomials.

1. x^2y, xy^3

2. a^2b^3c, abc^4

3. $x + 1, x + 3$

4. $g - 1, g^2 + 3g - 4$

5. $2r + 2, r^2 + r, r + 1$

6. $3, 4w + 2, 4w^2 - 1$

7. $x^2 + 2x - 8, x + 4$

8. $x^2 - x - 6, x^2 + 6x + 8$

9. $d^2 + 6d + 9, 2(d^2 - 9)$

Simplify each expression.

10. $\frac{5}{6ab} - \frac{7}{8a}$

11. $\frac{5}{12x^4y} - \frac{1}{5x^2y^3}$

12. $\frac{1}{6c^2d} + \frac{3}{4cd^3}$

13. $\frac{4m}{3mn} + 2$

14. $2x - 5 - \frac{x - 8}{x + 4}$

15. $\frac{4}{a - 3} + \frac{9}{a - 5}$

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

17. $\frac{2 - 5m}{m - 9} + \frac{4m - 5}{9 - m}$

18. $\frac{y - 5}{y^2 - 3y - 10} + \frac{y}{y^2 + y - 2}$

19. $\frac{5}{2x - 12} - \frac{20}{x^2 - 4x - 12}$

20. $\frac{2p - 3}{p^2 - 5p + 6} - \frac{5}{p^2 - 9}$

21. $\frac{1}{5n} - \frac{3}{4} + \frac{7}{10n}$

22. $\frac{2a}{a - 3} - \frac{2a}{a + 3} + \frac{36}{a^2 - 9}$

23. $\dfrac{\frac{2}{x - y} + \frac{1}{x + y}}{\frac{1}{x - y}}$

24. $\dfrac{\frac{r + 6}{r} - \frac{1}{r + 2}}{\frac{r^2 + 4r + 3}{r^2 + 2r}}$

25. GEOMETRY The expressions $\frac{5x}{2}$, $\frac{20}{x + 4}$, and $\frac{10}{x - 4}$ represent the lengths of the sides of a triangle. Write a simplified expression for the perimeter of the triangle.

26. KAYAKING Mai is kayaking on a river that has a current of 2 miles per hour. If r represents her rate in calm water, then $r + 2$ represents her rate with the current, and $r - 2$ represents her rate against the current. Mai kayaks 2 miles downstream and then back to her starting point. Use the formula for time, $t = \frac{d}{r}$, where d is the distance, to write a simplified expression for the total time it takes Mai to complete the trip.

(10) $\frac{4}{4}\cdot\frac{5}{6ab} - \frac{7}{8a}\cdot\frac{3b}{3b}$

$$\frac{20-21b}{24ab}$$

(12) $\frac{2d^2}{2d^2}\cdot\frac{1}{6c^2d} + \frac{3}{4cd^3}\cdot\frac{3c}{3c}$

$$\frac{2d^2+9c}{12c^2d^3}$$

(14) $\frac{x+4}{x+4}\left(\frac{2x-5}{1}\right) - \frac{x-8}{x+4}$

$$\frac{(x+4)(2x-5)-(x-8)}{x+4}$$

$$\frac{2x^2-5x+8x-20-x+8}{x+4}$$

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

$$\frac{2(x^2+x-6)}{x+4}$$

$$\frac{2(x+3)(x-2)}{x+4}$$

(16) $\frac{16}{x^2-16} + \frac{2}{x+4}\cdot\frac{(x-4)}{(x-4)}$

$(x+4)(x-4)$

$$\frac{16+2x-8}{(x+4)(x-4)}$$

$$\frac{2x+8}{(x+4)(x-4)}$$

$$\frac{2\cancel{(x+4)}}{\cancel{(x+4)}(x-4)}$$

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

(18) $\frac{\cancel{y-5}}{y^2-3y-10} + \frac{y}{y^2+y-2}$

$\cancel{(y-5)}(y+2)$ $\quad (y+2)(y-1)$

$$\frac{y-1}{y-1}\cdot\frac{1}{y+2} + \frac{y}{(y+2)(y-1)}$$

$$\frac{y-1+y}{(y+2)(y-1)} \rightarrow \frac{2y-1}{(y+2)(y-1)}$$

(20) $\frac{p+3}{p+3}\cdot\frac{2p-3}{p^2-5p+6} - \frac{5}{p^2-9}\cdot\frac{p-2}{p-2}$

$(p-3)(p-2)$ $\quad (p+3)(p-3)$

$$\frac{(p+3)(2p-3)-5(p-2)}{(p+3)(p-3)(p-2)}$$

$$\frac{2p^2-3p+6p-9-5p+10}{(p+3)(p-3)(p-2)}$$

$$\frac{2p^2-2p+1}{(p+3)(p-3)(p-2)}$$

(22) $\frac{(a+3)}{(a+3)}\frac{2a}{a-3} - \frac{(a-3)}{(a-3)}\frac{2a}{a+3} + \frac{36}{a^2-9}$

$(a+3)(a-3)$

$$\frac{2a^2+6a-(2a^2-6a)+36}{(a+3)(a-3)}$$

$$\frac{\cancel{2a^2}+6a-\cancel{2a^2}+6a+36}{(a+3)(a-3)}$$

$$\frac{12a+36}{(a+3)(a-3)}$$

$$\frac{12\cancel{(a+3)}}{\cancel{(a+3)}(a-3)}$$

$$\frac{12}{a-3}$$

(24) $\dfrac{\frac{r+6}{r}-\frac{1}{r+2}}{\frac{r^2+4r+3}{r^2+2r}}$ $(r+3)(r+1)$ $r(r+2)$ $\Rightarrow (r+2)\left(\frac{r+6}{r}-\frac{1}{r+2}\right)(r)\left(\frac{r(r+2)}{(r+3)(r+1)}\right)$

$$\frac{(r+2)(r+6)-r}{\cancel{r(r+2)}}\cdot\frac{\cancel{r(r+2)}}{(r+3)(r+1)}$$

$$\frac{r^2+6r+2r+12-r}{(r+3)(r+1)}$$

$$\frac{r^2+7r+12}{(r+3)(r+1)}$$

$$\frac{(r+4)\cancel{(r+3)}}{\cancel{(r+3)}(r+1)}$$

$$\frac{r+4}{r+1}$$

(25) $\frac{5x}{2}+\frac{20}{x+4}+\frac{10}{x-4}$

$$\frac{5(x^3-4x-16)}{2(x-4)(x+4)}$$