

1. Explain **how** to add rational expressions with unlike denominators.

Perform the indicated operation and then simplify.

2. $\frac{9}{x+1} - \frac{2x}{x+1}$ $\frac{9-2x}{x+1}$

3. $\frac{5x}{x+3} + \frac{15}{x+3}$ 5

4. What is the Least Common Multiple of the polynomials $3x^2 - 9x$ and $6x^2$?

- A. $3x(x-3)$ B. $6x^2$ C. $6x(x-3)$ D. $6x^2(x-3)$

Perform the indicated operation and then simplify.

5. $\frac{12}{5x} + \frac{7}{6x}$ $x \neq 0$

$$\frac{107}{30x}$$

6. $\frac{8}{3x^2} - \frac{5}{9x}$ $x \neq 0$

$$\frac{24-5x}{9x^2}$$

7. $\frac{3}{x+4} - \frac{1}{x+6}$ $x \neq -4, 6$

$$\frac{2x+14}{(x+4)(x+6)}$$

8. $\frac{-15x}{x^2-8x+16} + \frac{12}{x-4}$ $x \neq 4$

$$\frac{-3x-48}{(x-4)^2}$$

9. Which expression is equivalent to $\frac{2x}{x+4} - \frac{x^2+4}{x^2-16}$?

A. $\frac{1}{x+4}$

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

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

D. $\frac{3x^2-8x+4}{(x+4)(x-4)}$

Perform the indicated operation and then simplify.

10. $\frac{x}{x^2-9} + \frac{x+1}{x^2+6x+9}$ $x \neq 3, -3$

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

11. $\frac{x+2}{x-4} + \frac{2}{x} - \frac{5x}{3x-1}$ $x \neq 4, 0, \frac{1}{3}$

$\frac{-2x^3+31x^2-28x+8}{x(x-4)(3x-1)}$

12. $\frac{x+3}{x^2-2x-8} - \frac{x-5}{x^2-12x+32}$ $x \neq 4, 8, -2$

$\frac{-2x-14}{(x+4)(x+2)(x-8)}$

13. $\frac{x+3}{x^2-25} - \frac{x-1}{x-5} + \frac{3}{x+3}$ $x \neq 5, -5, -3$

$\frac{-x^3-3x^2-x-51}{(x+5)(x-5)(x+3)}$

$$14. \quad \frac{2x}{2x^2-8x} + \frac{8}{3x} \quad x \neq 0, 4$$

$$15. \quad \frac{1}{x+1} - \frac{2}{(x+1)^2} + \frac{3}{x^2-1} \quad x \neq 1, -1$$

$$\frac{22x-64}{6x(x-4)} = \frac{11x-32}{3x(x-4)}$$

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

Solve.

$$16. \quad 4(x-2)^2 = 144$$

$$x = 8, -4$$

$$17. \quad 6x^2 - 25 = x^2$$

$$x = \pm\sqrt{5}$$

$$18. \quad 3(x+5)^2 - 10 = 182$$

$$x = 3, -13$$

$$19. \quad 3x^2 + x = 14$$

$$x = -7/3, 2$$

$$19. \quad 4(x-3)^2 - 10 = 90$$

$$x = 8, -2$$

$$20. \quad 5x^2 + x = 25 + x$$

$$x = \pm\sqrt{5}$$

$$x = 8, -2$$

Factor:

20. $3x^3 + 4x^2 + 9x + 12$

$x^2(3x+4) + 3(3x+4)$

$(3x+4)(x^2+3)$

$(3x+4)(x+\sqrt{3}i)(x-\sqrt{3}i)$

21. $15x^3 - 40x^2 + 6x - 16$

$5x^2(3x-8) + 2(3x-8)$

$(3x-8)(5x^2+2)$

22. $7k^3 + 28k^2 - 4k - 16$

$7k^2(k+4) - 4(k+4)$

$(k+4)(7k^2-4)$

$(k+4)(\sqrt{7}k+2)(\sqrt{7}k-2)$

23. $3x^3 - 12x^2 + 2x - 8$

$3x^2(x-4) + 2(x-4)$

$(x-4)(3x^2+2)$

24. $x^6 + 4x^4 - 9x^2 - 36$

$x^4(x^2+4) - 9(x^2+4)$

$(x^2+4)(x^4-9)$

$(x+2i)(x-2i)(x^2-3)(x^2+3)$

$(x+2i)(x-2i)(x+\sqrt{3})(x-\sqrt{3})(x+\sqrt{3}i)(x-\sqrt{3}i)$

25. $x^6 - 2x^4 - 24x^2$

$x^2(x^4 - 2x^2 - 24)$

$x^2(x^2-6)(x^2+4)$

$x^2(x+\sqrt{6})(x-\sqrt{6})(x+2i)(x-2i)$