

Express all answers in simplest form.

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

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

3. $\frac{x^2}{x-3} + \frac{9}{3-x}$

4. $\frac{6}{x} - \frac{5}{x+4}$

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

6. $4 - x + \frac{5}{x+7}$

7. $\frac{3x+2}{3x-6} - \frac{x+2}{x^2-4}$

8. $\frac{2x}{x^2-8x+16} + \frac{x+3}{3x^2-10x-8}$

9. $\left(\frac{x}{b} - \frac{b}{x}\right) \div \frac{x-b}{x}$

10. $\frac{x+2}{x-1} - \frac{2}{x+6} - \frac{14}{x^2+5x-6}$

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

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

13. $\left(x-a + \frac{2a^2}{x+a}\right) \left(\frac{1}{x^2} - \frac{1}{a^2}\right) \div \left(x^3 - \frac{ax^3+a^4}{x+a}\right)$

14. $\frac{\frac{1}{a} + \frac{1}{x}}{\frac{x}{a} - \frac{1}{x}}$

15. $\frac{\frac{1}{x} - \frac{1}{y}}{\frac{1}{x^2} - \frac{1}{y^2}}$

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

17. $\frac{\frac{1}{x-1} + \frac{1}{x+1}}{\frac{1}{x-1} - \frac{1}{x+1}}$

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

19. $\frac{\frac{6}{x-1} - 3}{\frac{3}{x}}$

20. $\frac{\frac{1}{x} + \frac{1}{2x+1}}{\frac{4}{2x+1}}$

21. $\frac{\frac{4}{x^2-25} + \frac{2}{x-5}}{\frac{1}{x+5} + \frac{1}{x-5}}$

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

23. $\frac{\frac{4}{2x^2-x-1} - \frac{4}{x-1}}{\frac{8x+1}{2x^2+x}}$

24. $\frac{(x+a)(x^{-1} - a^{-1})}{(x-a)(x^{-1} + a^{-1})}$

25. $\frac{1 + \frac{2 + \frac{1}{x}}{x}}{1 + \frac{1}{x}}$

26. $\frac{\frac{1}{x-1}}{x + \frac{1}{x - \frac{1}{x}}}$

27. Find the values of A, B, and C so that $\frac{x^2+2}{x(x+1)(x+2)} = \frac{A}{x} + \frac{B}{x+1} + \frac{C}{x+2}$

- Answers:
1. $\frac{x^2 + 9x - 12}{3x^2}$
 2. $\frac{2x - 9}{12x^2}$
 3. $x + 3$
 4. $\frac{x + 24}{x(x + 4)}$
 5. $\frac{x^2 - 2x - 2}{(2x + 1)(x + 2)}$
 6. $\frac{-x^2 - 3x + 33}{x + 7}$
 7. $\frac{3x - 1}{3(x - 2)}$
 8. $\frac{7x^2 + 3x - 12}{(3x + 2)(x - 4)^2}$
 9. $\frac{x + b}{b}$
 10. $\frac{x}{x - 1}$
 11. $\frac{-2x^2 + 5x + 5}{(x + 1)(x^2 - x + 1)}$
 12. $\frac{3}{x(x - 2)}$
 13. $\frac{-1}{a^2 x^2}$
 14. $\frac{1}{x - a}$
 15. $\frac{xy}{y + x}$
 16. $\frac{2 - 11x}{3(x^2 + x + 2)}$
 17. x
 18. $\frac{x}{x + 1}$
 19. $\frac{x(3 - x)}{x - 1}$
 20. $\frac{3x + 1}{4x}$
 21. $\frac{x + 7}{x}$
 22. $\frac{1 + x^2}{x}$
 23. $\frac{-8x^2}{8x^2 - 7x - 1}$
 24. -1
 25. $\frac{x + 1}{x}$
 26. $\frac{x + 1}{x^3}$
 27. $A = 1, B = -3, C = 3$