

Exercises ^[A-1]

Perform the indicated operations in each of the following, and express the result in lowest terms:

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

5. $\frac{1}{p-1} + \frac{1}{1-p}$

9. $\frac{p}{p-q} - \frac{q}{q+p}$

2. $\frac{x}{2y} - \frac{5x}{6y} + \frac{x}{3y}$

6. $\frac{1}{p+1} + \frac{p}{1+p}$

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

3. $\frac{a+b}{a^2} - \frac{1}{a}$

7. $1 - \frac{p}{1+p}$

11. $\frac{3n}{n-1} + \frac{3}{1-n}$

4. $\frac{1}{p-1} - \frac{1}{p+1}$

8. $\frac{p+q}{p-q} - 1$

12. $\frac{4a}{3b-2a} + \frac{6b}{2a-3b}$

13. $\frac{n}{n-1} - \frac{2n}{n^2-1}$

17. $\frac{1}{a+2} + \frac{2}{2a+a^2}$

14. $\frac{1}{4a-2b} - \frac{1}{4a+2b} - \frac{b}{4a^2-b^2}$

18. $\frac{1}{m-n} - \frac{m}{(n-m)^2}$

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

19. $\frac{a+2}{a^2+3a} - \frac{a-2}{a^2-3a}$

16. $\frac{1}{(a-b)(a-c)} + \frac{1}{(b-c)(b-a)}$

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

21. $\frac{b^2+1}{b^2-1} + \frac{1}{1+b} - \frac{1}{1-b}$

22. $\frac{2(3a+b)}{5a^2+6ab+b^2} - \frac{a-b}{5a^2-4ab-b^2}$

23. $\frac{a+b}{a^2-4b^2} + \frac{a-b}{(a+2b)^2}$

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

25. $\frac{1}{(a-b)(a-c)} + \frac{1}{(b-c)(b-a)} + \frac{1}{(c-a)(c-b)}$

26. $\frac{2}{a+3b} - \frac{1}{2a+b} - \frac{a+b}{a^2+4ab+3b^2}$

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

Exercises [A-2]

Combine the following fractions, and express the result in lowest terms.

1. $\frac{3a}{a-2b} + \frac{6b}{2b-a}$
2. $\frac{b}{a+b} + \frac{a}{b-a} + 1$
3. $\frac{2}{a-b} + \frac{a+3b}{b^2-a^2}$
4. $\frac{b}{a^2-ab} - \frac{a}{ab-b^2}$
5. $\frac{1}{4x-4} - \frac{1}{2x^2-2}$
6. $\frac{x}{x^2-y^2} + \frac{1}{2y-2x} - \frac{1}{2y+2x}$
7. $\frac{2}{x^2-2x} - \frac{3}{x^2-x-2}$
8. $\frac{t}{(1-t)^2} + \frac{1}{1-t^2}$
9. $\frac{x}{2x-1} + \frac{x-1}{2x+1} - \frac{2x}{4x^2-1}$
10. $\frac{a+2b}{a^2-ab} - \frac{2a+b}{a^2-3ab+2b^2} - \frac{a-3b}{a^2-2ab}$
11. $\frac{x+3}{5x-10} - \frac{x-2}{5x+15} + \frac{5}{x^2+x-6}$
12. $\frac{a+3b}{2b+2a} + \frac{a}{b-a} + \frac{a^2+b^2}{a^2-b^2}$
13. $\frac{x-3}{2x+6} - \frac{x+3}{3x-9} - \frac{5x^2+27}{6x^2-54}$
14. $\frac{y+1}{(y-1)^2} + \frac{2-2y}{(y-1)^3} + \frac{1}{y-1}$
15. $\frac{a+2}{a^2+5a+6} - \frac{2+a}{4-a^2} + \frac{2-a}{a^2+a-6}$
16. $\frac{a}{(a-b)(a-c)} + \frac{b}{(b-c)(b-a)}$

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$$1. \frac{1}{x(x+1)}$$

$$2. 0$$

$$3. \frac{b}{a^2}$$

$$4. \frac{2}{(p+1)(p-1)}$$

$$5. 0$$

$$6. 1$$

$$7. \frac{1}{1+p}$$

$$8. \frac{2q}{p-q}$$

$$9. \frac{p^2+q^2}{(p+q)(p-q)}$$

$$0. \frac{1}{x-3}$$

$$1. 3$$

$$2. -2$$

$$3. \frac{n}{n+1}$$

$$4. 0$$

$$15. \frac{4+x}{(2+x)(2-x)}, \text{ or } -\frac{x+4}{(x+2)(x-2)}$$

$$16. \frac{1}{(b-c)(c-a)}$$

$$17. \frac{1}{a}$$

$$18. \frac{-n}{(m-n)^2}$$

$$19. \frac{2}{(3+a)(3-a)}, \text{ or } -\frac{2}{(a+3)(a-3)}$$

$$20. 0$$

$$21. \frac{b+1}{b-1}$$

$$22. \frac{1}{a+b}$$

$$23. \frac{2a^2+4b^2}{(a+2b)^2(a-2b)}$$

$$24. \frac{18}{x(x+3)(x-3)}$$

$$25. 0$$

$$26. \frac{a-2b}{(a+3b)(2a+b)}$$

$$27. \frac{1}{2(x+3)(x+2)}$$

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$$1. 3$$

$$2. \frac{-2b^2}{(a+b)(a-b)}$$

$$3. \frac{1}{a+b}$$

$$4. -\frac{a+b}{ab}$$

$$5. \frac{1}{4(x+1)}$$

$$6. 0$$

$$7. \frac{-1}{x(x+1)}$$

$$8. \frac{1+t^2}{(1-t)^2(1+t)}$$

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

$$10. \frac{-2a^2+3ab-7b^2}{a(a-b)(a-2b)}$$

$$11. \frac{2}{x-2}$$

$$12. \frac{1}{2}$$

$$13. -\frac{2x^2+15x+9}{3(x+3)(x-3)}$$

$$14. \frac{2}{y-1}$$

$$15. \frac{1}{a-2}$$

$$16. \frac{c}{(c-a)(b-c)}, \text{ or } \frac{-c}{(a-c)(b-c)}$$