In freeing an expression of several signs of grouping, any order may be followed; but usually they are removed by removing the innermost at each step. They may be removed at once if the proper signs for the terms can be readily determined.

Example: Simplify \(7a + 2(3a - (a - (b + 2a)) - 4(a - 2b))\).

By removing the innermost at each step, we have
\[a+2(3a-(a-b-2a)-4a+8b) = 7a+2(3a-a+b+2a-4a+8b) = 7a+6a-2a+2b+4a-8a+16b = 7a+18b\]

EXERCISES

Remove the signs of grouping and collect terms. Click inside the blue rectangle to check your answer:

1. \(4a - (2a + b - (-a + b - c) + 2c)\)
2. \(2x - (3x - 2y) - (-2x + y - (2y - x))\)
3. \(7a + (-a - (-5a + 4x) + 3x) - (6a - x)\)
4. \(a - (-a + (a - b + ab) - b - (ab - a + b)) - b\)
5. \(((a + b - c) - (a - b + c)) - ((b - c + a) - (b + c - a))\)
6. \(3(x - y + 8) - 4(x - 5y + 3) + 6(x - 2y - 1)\)
7. \(a(a^2 + 2a - 2) - 2(a^2 - a + 1) - a(a^2 - 1)\)
8. \((a - b)/x - (b - c)/x - (c - a)/x - (a - b + c)/x\)
9. \((5(a - b))/x - (a + 2b - 4)/x + (b - 2a - 6)/x\)
10. \((6x^2 - 10)/2 + (6x^2 - 6x + 12)/(-6) - (8x^2 + 12x - 20)/4\)
Enclose the last three terms of the following expressions in parentheses preceded by a minus sign:

11. \( a^2 - b^2 + 2b - 1 \)
12. \( x^2 - a^2 - 2ab - b^2 \)
13. \( x^3 + y^3 - x^2 + xy - y^2 \)
14. \( ax - bx + cx - a + b - c \)
15. \( (a - b - c)^2 - a + b + c \)
16. \( x^6 - y^6 - x^4 - x^2y^2 - y^4 \)

In the following expressions collect the coefficients of \( x \) within parentheses preceded by a minus sign:

17. \( a^2 - b^2 - ax + bx \)
18. \( a^2 - 4 - ax - 2x \)
19. \( a^3 + b^3 - ax - bx \)
20. \( a - b + c - ax + bx - cx \)
21. \( 1 - a^3 - x - ax - a^2 x \)
22. \( a^3 + 1 - a^2 x + ax - x \)
23. \( (h - k)^2 - hx + kx \)
24. \( ay + by - cy - ax - bx + cx \)