Mathematical Laws

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The **Commutative Law** allows you to switch the order of the terms you are performing an operation on.

For addition:

$$a + b = b + a$$

For multiplication:

$$a \times b = b \times a$$

The **Associative Law** allows you tells us that how we group things doesn't matter.

For addition:

$$(a + b) + c = a + (b + c)$$

For multiplication:

$$(a \times b) \times c = a \times (b \times c)$$

The **Distributive Law** allows you to multiply a number into a larger term, or pull out a common factor form a few terms.

$$a \times (b + c) = a \times b + a \times c$$

Questions:

1. Simplify $x^2 - 7x + 2 - 3x - 2x^2 + 9$

2. Simplify $-7x^4 + 5x^3 + 13x - 1 - 5x^5 + 7x^4 - 10x^3 - 7x - 3$

3. Simplify $x^3 + 2x^2 - 4x^3 + x - 13x^2 + 3 - 2x + 4$

4. Simplify $5x^4 - 6x^4 + x^3 - 8x^2 + 10x + 12 - 7x^5 + 3x^4 - 2x^2 + 2 - 6x + 1$

5. Simplify $x^2 - 7x + 10 - 2x^2 + 4x - 5 + x^2 + 3x - 5$

6. Simplify $12a + 7b - 3c - 7a + 4b - c$

7. Simplify $-10a + 3b + 24a - 17b$

8. Simplify $4a + 4b - 3a + 9c + 2 - 3b + a - 5c + 2c - b + 3$

9. Simplify $12\Omega - 5\Psi + 7 - 6\Omega - 2\Psi - 3$

10. Simplify $-4\Omega + 3\Psi + 23 - 13\Omega + 14\Psi - 17$

11. Simplify $4 \times (5x^2 + 6x - 9)$

12. Simplify $-2 \times (x^2 - 7x - 17)$

13. Simplify $3 \times (4x^3 - 2x^2 - 5x + 12)$

14. Simplify $-6 \times (3a + 5b - 2c + 7d - 10)$

15. Simplify $8 \times (-2a + 8b + c - 5d - 7)$

16. Simplify $9 \times (-a - 2b + 4c + 6d + 9)$

17. Simplify $11 \times (2\Omega - 3\Psi + 10)$

18. Simplify $-3 \times (13\Omega - 19\Psi - 9)$

19. Simplify $-5 \times (-16\Omega + 14\Psi - 12)$

20. Simplify $2 \times (-9x^6 - 7x^5 + 3x^4 + x^3 - 7x^2 + 14x - 13)$

21. Simplify $2 \times (2x^2 - 5x + 6) - 3 \times (x^2 + 3x + 4)$

22. Simplify $-1 \times (7x^2 - 6x - 6 + 4x^2 + 2x - 5)$

23. Simplify $-3 \times (3a + 10b - 8) + 2 \times (5a + 12b - 9)$

24. Simplify $9 \times (2\Omega + 4\Psi - 1) + 8 \times (\Omega - 5\Psi + 2)$

25. Simplify $2 \times \left(-5 \times (3\Omega - 2\Psi + 5) + 7 \times (2\Omega - \Psi + 4) \right)$

26. Simplify $4a - 3b + 2 \times \left(\dfrac{3}{2}a - \dfrac{3}{4}b \right)$

27. Simplify $\dfrac{5x^2 - 6x + 9 - x^2 - 10x + 5}{8}$

28. Simplify $\dfrac{12a + 5b - 7 - 2a + 13b + 4}{6}$

29. Simplify $\dfrac{4\Omega + 9\Psi + 11 + 5\Omega + \Psi + 4}{12}$

30. Simplify $\dfrac{-6\Omega + 3\Psi + 1 - 15\Omega + 2\Psi + 2}{7}$