

Boost Free Lessons - Year 8 Maths

Lesson 2: Index Laws

Name: _____ Grade: _____ Date: _____

Worked Example 1

Simplify $a^5 \times a^3$

1. The bases are the same and the terms are being multiplied, so add the indices.
2. $5 + 3 = 8$.
3. Keep the base exactly as it is. You never multiply the base by itself.

$$= a^8$$

Worked Example 2

Simplify $12m^7 \div 4m^2$

1. Deal with the numbers first: $12 \div 4 = 3$.
2. The bases are the same and the terms are being divided, so subtract the indices.
3. $7 - 2 = 5$.

$$= 3m^5$$

Remember: $a^m \times a^n = a^{m+n}$, $a^m \div a^n = a^{m-n}$, $(a^m)^n = a^{mn}$, and $a^0 = 1$. The bases must match before you can use any of these.



Question 1: Simplify the following.

1. $x^4 \times x^2$

2. $y^7 \div y^3$

3. $m^3 \times m$

4. $k^9 \div k^8$

5. $a^5 \times a^5$

6. $p^6 \div p^2$

7. $(b^3)^2$

8. $(c^4)^3$

9. t^0

10. $w^5 \times w^2 \div w^3$



Question 2: Simplify the following.

1. $3x^2 \times 4x^3$

2. $20m^6 \div 5m^2$

3. $(2a^3)^2$

4. $6y^4 \times 2y$

5. $15k^7 \div 3k^7$

6. $(3p^2)^3$

7. $8w^5 \div 2w$

8. $5c^2 \times 3c^4 \div 15c^3$



Question 3: Answer the following questions.

1. Simplify $2x^3 \times 5x^2 \times x$.

2. Simplify $(4m^2)^2 \div 2m^3$.

3. A square has a side length of $3a^2$. Write an expression for its area.

4. Use the division law to explain why $5^0 = 1$.

5. Simplify $7t^4 \times 2t^3 \div 14t^5$.





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Answers: Index Laws**Question 1**

- | | |
|-------------|-------------|
| 1. x^6 | 6. p^4 |
| 2. y^4 | 7. b^6 |
| 3. m^4 | 8. c^{12} |
| 4. k | 9. 1 |
| 5. a^{10} | 10. w^4 |

Question 2

- | | |
|------------|------------|
| 1. $12x^5$ | 5. 5 |
| 2. $4m^4$ | 6. $27p^6$ |
| 3. $4a^6$ | 7. $4w^4$ |
| 4. $12y^5$ | 8. c^3 |

Question 3

- $10x^6$
- $8m$
- $9a^4$
- $5^n \div 5^n = 5^0$ by the division law, but any number divided by itself is 1, so $5^0 = 1$.
- t^2

