

Boost Free Lessons - Year 9 Maths

Lesson 8: Multiplying and Dividing using Indices

Name: _____ Grade: _____ Date: _____

Worked Example 1

Simplify $5x^4 \times 3x^6$

1. Deal with the numbers first: $5 \times 3 = 15$.
2. The bases are the same and the terms are multiplied, so add the indices: $4 + 6 = 10$.
3. The base itself never changes.

$$= 15x^{10}$$

Worked Example 2

Simplify $\frac{24a^7b^3}{6a^2b^3}$

1. Numbers first: $24 \div 6 = 4$.
2. For a, the terms are divided so subtract the indices: $7 - 2 = 5$.
3. For b: $3 - 3 = 0$, and anything to the power of 0 equals 1.
4. Since $b^0 = 1$, the b disappears from the answer.

$$= 4a^5$$

Remember: $a^m \times a^n = a^{m+n}$, $a^m \div a^n = a^{m-n}$, $(a^m)^n = a^{mn}$, and $a^0 = 1$. Deal with the numbers separately from the letters.



Question 1: Simplify the following.

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

2. $y^9 \div y^4$

3. $2a^4 \times 5a^3$

4. $18m^8 \div 3m^5$

5. $(k^3)^4$

6. $4p^2 \times 3p^7$

7. $20t^6 \div 4t^6$

8. $(2w^5)^3$

9. $6c^4 \times c^0$

10. $30n^9 \div 5n^3$



Question 2: Simplify the following.

1. $3a^2b \times 4ab^3$

2. $15x^5y^3 \div 5x^2y$

3. $(2m^3n)^2$

4. $6p^4q^2 \times 2pq^5$

5. $24a^6b^4 \div 8a^6b$

6. $(3x^2y^3)^3$

7. $10m^5 \times 4m^2 \div 8m^3$

8. $(4a^3)^2 \div 2a^4$



Question 3: Answer the following questions.

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

2. Simplify $(5a^2)^2 \div 5a$.

3. A cube has a side length of $2m^3$. Write an expression for its volume.

4. Simplify $\frac{6x^5y^2}{2x^3y^2} \times x$.

5. Explain why $a^5 \div a^5$ shows that $a^0 = 1$.





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Answers: Multiplying and Dividing using Indices

Question 1

- | | |
|-------------|--------------|
| 1. x^8 | 6. $12p^9$ |
| 2. y^5 | 7. 5 |
| 3. $10a^7$ | 8. $8w^{15}$ |
| 4. $6m^3$ | 9. $6c^4$ |
| 5. k^{12} | 10. $6n^6$ |

Question 2

- | | |
|---------------|---------------|
| 1. $12a^3b^4$ | 5. $3b^3$ |
| 2. $3x^3y^2$ | 6. $27x^6y^9$ |
| 3. $4m^6n^2$ | 7. $5m^4$ |
| 4. $12p^5q^7$ | 8. $8a^2$ |

Question 3

1. $6x^8$
2. $5a^3$
3. $8m^9$
4. $3x^3$
5. Any number divided by itself equals 1, and the division law gives $a^{5-5} = a^0$, so $a^0 = 1$.

