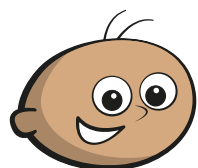


Using the addition and subtraction law for indices

1



2^8 divided by 2^5 is 2^3

- a) Cancel the common factors in this division to show that Tommy is correct.

$$\frac{2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2}{2 \times 2 \times 2 \times 2 \times 2}$$

b)

$$2^8 = 256$$

$$2^5 = 32$$

Work out 256 divided by 32

8

Explain your method.

$$2^3 = 2 \times 2 \times 2 = 8$$

2

Complete the calculations by filling in the missing values.

a) $\frac{3^5}{3^3} = \frac{3 \times 3 \times 3 \times 3 \times 3}{3 \times 3 \times 3} = 3^2$

b) $\frac{5^6}{5^3} = \frac{5 \times 5 \times 5 \times 5 \times 5 \times 5}{5 \times 5 \times 5} = 5^3$

c) $\frac{7^{10}}{7^4} = \frac{7 \times 7 \times 7 \times 7 \times 7 \times 7 \times 7 \times 7 \times 7 \times 7}{7 \times 7 \times 7 \times 7} = 7^6$

3

Complete the expressions by filling in the missing values.

a) $\frac{k^5}{k^3} = \frac{k \times k \times k \times k \times k}{k \times k \times k} = k^2$

b) $\frac{m^6}{m^4} = \frac{m \times m \times m \times m \times m \times m}{m \times m \times m \times m} = m^2$

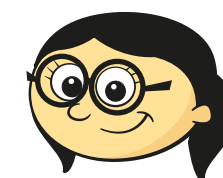
c) $\frac{t^{12}}{t^5} = \frac{t \times t \times t \times t \times t \times t \times t \times t \times t \times t \times t \times t}{t \times t \times t \times t \times t} = t^7$

What patterns do you notice?

The base stays the same and you subtract the powers.

4

The subtraction rule for indices can be described using algebra.



Complete the statement.

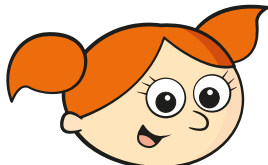
The subtraction rule for indices is $x^m \div x^n \equiv x^{m-n}$

Describe the rule in your own words.

When dividing, the base stays the same and you subtract the powers.

5 Simplify the expressions, giving each answer as a single term.

a) $2^{14} \div 2^6 = 2^8$ d) $p^8 \div p^2 = p^6$
 b) $a^9 \div a^5 = a^4$ e) $y^8 \div y^4 = y^4$
 c) $t^6 \div t^2 = t^4$ f) $3k^7 \div k^4 = 3k^3$

6 a)  $t^4 \div t = 4$ because the t s cancel out.

Discuss with a partner why Alex is wrong.

What is the correct answer? t^3

b) Simplify the expressions.

$2^7 \div 2 = 2^6$ $a^9 \div a = a^8$ $t^6 \div t = t^5$

7 Complete the statements.

a) $(4^3 \times 4^5) \div 4^2 = 4^8 \div 4^2 = 4^6$

b) $(t^5 \times t^{10}) \div (t^6 \times t^7) = t^{15} \div t^{13} = t^2$

c) $(m^8 \times m^4) \div (m^7 \times m^5) = m^{12} \div m^{12} = m^0$

8 Fill in the correct operation for each statement.

a) $4^5 \times 4^7 = 4^{12}$ c) $t^2 \times t^6 = t^{12}$ $t^6 \div t^4 = t^2$
 b) $7^6 \div 7^4 = 7^2$ d) $h^4 \div h^3 = h^1$ $h^3 \div h^{10} = h^{-7}$

9 Add brackets to make the statements true.

a) $9^8 \div (9^3 \times 9^2) = 9^3$ c) $(a^4 \times a^7) \div (a^8 \times a^2) = a$
 b) $6^5 \div (6^2 \times 6^3) \times 6^5 = 6^5$ d) $(f^{10} \div f^3) \div (f^{12} \div f^8) = f^3$

10 Rearrange the cards to make a correct statement.

3⁹ × 3³ ÷ 3⁵ = 3⁷

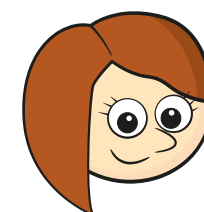
3⁵ 3³ 3⁹ 3⁷

× = ÷

Compare answers with a partner.

11 Rosie and Teddy are looking at the same question.

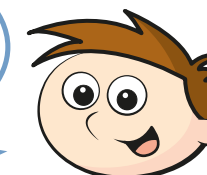
Work out $5^2 \div 5^2$



Rosie

I think the answer is 1, because if you divide a number by itself you always get the number 1

I think the answer is 5^0 , because when you use the subtraction rule for indices, you subtract the powers.



Teddy

Who is correct? Circle your answer.

Teddy Rosie both neither

Explain your answer.