

Using the addition law for indices

1

a) Fill in the gaps in the calculation.

$$2^4 \times 2^3 = 2 \times 2 \times 2 \times 2 \times \boxed{} \times \boxed{} \times \boxed{} = 2 \boxed{}$$

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

b) What happens to the base value when 2^4 and 2^3 are multiplied?

It remains the same.

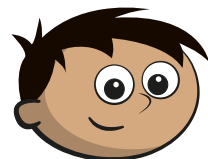
c) What happens to the indices when 2^4 and 2^3 are multiplied?

We add the indices.

2

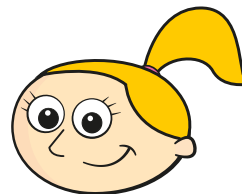
Amir and Eva are both trying a problem.

Simplify $3^{10} \times 3^{20}$



It is going to take a long time to answer this question because I have to write out the whole multiplication.

I can do it without writing out the multiplication.



What has Eva noticed?

That all they have to do is add the indices together and since the base are both the same the answer would be 3^{30}

3

Complete the statements.

a) $3^4 \times 3^5 = 3^{\boxed{9}}$

d) $a^4 \times a^3 \equiv a^{\boxed{7}}$

b) $4^2 \times 4^6 = \boxed{4^8}$

e) $y^{11} \times y^6 \equiv y^{\boxed{17}}$

c) $7^8 \times 7^{10} = \boxed{7^{18}}$

f) $p^4 \times p^7 \equiv p^{\boxed{11}}$

4

The addition rule for indices can be described using algebra.

Complete the statement.

The addition rule for indices is $x^a \times x^b \equiv x^{a+b}$

Describe the rule in your own words.

When we multiply the same base with different indices, the result is the base powered with the sum of the indices

5

Simplify the expressions.

a) $x^3 \times x^4 \times x^5 \equiv x^{\boxed{12}}$

c) $h^3 \times h^8 \times h^{10} \equiv h^{\boxed{21}}$

b) $v^7 \times v^7 \times v^7 \equiv v^{\boxed{21}}$

d) $w^{50} \times w^{100} \times w^{250} \equiv w^{\boxed{400}}$

6

Identify and explain the mistake that has been made in each statement.

a) $3^2 \times 3^4 = 3^8$

The mistake is that (s)he multiplied the indices while you are supposed to add them

b) $5^2 \times 5^3 = 25^5$

(S)He multiplied the base by itself, while it is supposed to remain the same .

c) $10^4 + 10^5 = 10^9$

The mistake is that the equation is an addition and not a multiplication

d) $5^3 \times 2^6 = 7^9$

(S)He added the bases

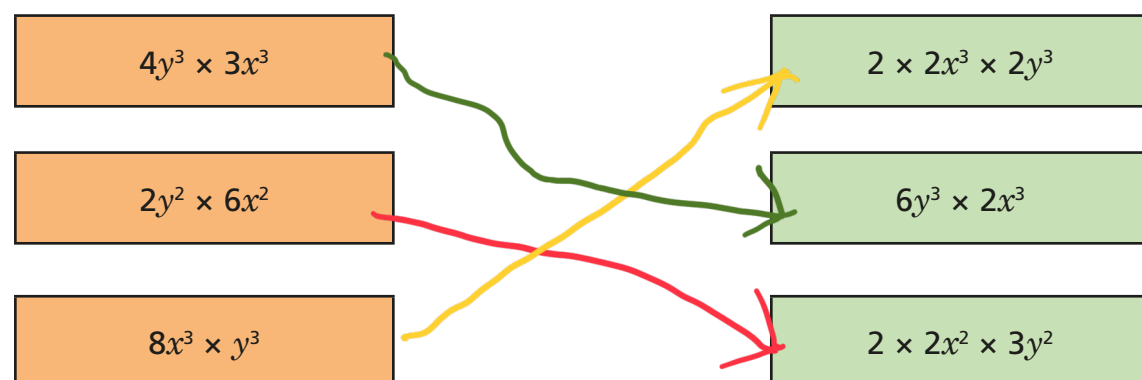
7 Simplify the expressions.

a) $a^3 \times b^2 \times a^4 \times b^5 \equiv a^{\boxed{7}} \times b^{\boxed{7}} \equiv \underline{a^7b^7}$

b) $m^4n^3 \times m^2n^3 \equiv \underline{m^6 \times n^6 = m^6n^6}$

c) $p^2q^2 \times p^3r^3 \times q^4r^4 \equiv \underline{p^5 \times q^6 \times r^7 = p^5q^6r^7}$

8 Match the equivalent expressions.



9 Fill in the missing powers and coefficients.

a) $2k^3 \times 4k^{\boxed{3}} \equiv \boxed{8} k^6$

b) $2m^2 \times 3m^{\boxed{10}} \times \boxed{5} m^4 \equiv 30m^{16}$

c) $3d^{\boxed{3}} \times \boxed{2} D^2 \times 2d^4 \times 3D^{\boxed{3}} \equiv 36d^7D^5$

10 Find the value of x .

a) $2^7 \times 2^x = 2^{12}$

c) $d^x \times d^{x+1} = d^{11}$

$x = \boxed{5}$

$x = \boxed{5}$

b) $3^x \times 3^x \times 3^4 = 3^{20}$

d) $5^{2x} \times 5^x \times 5^2 = 5^{23}$

$x = \boxed{8}$

$x = \boxed{7}$

11

$3^4 \times 3 \equiv 3^4$,
because there is no
power on the 3



a) Write out the full multiplication to show why Mo is incorrect.

$\underline{3 \times 3 \times 3 \times 3 \times 3 = 3^5}$

b) Simplify the expressions.

$4^6 \times 4$

5×5^7

$a^3 \times a^2 \times a$

$3b^4 \times 4b$

$\underline{4^7}$

$\underline{5^8}$

$\underline{a^6}$

$\underline{12b^5}$