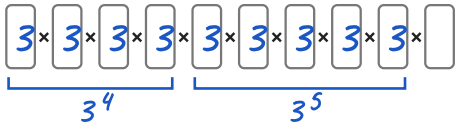
# Index Laws

ANSWERS

**1**

Write $3^4 \times 3^5$ as a single power of 3.

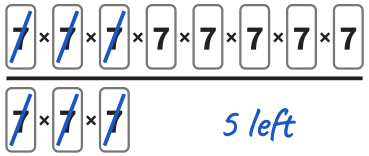



Multiply, so add the powers.

$3^4 \times 3^5 = 3^{9}$

**2**

Write $7^8 \div 7^3$ as a single power of 7.




Cancel the 7s. Divide, so subtract the powers.

$7^8 \div 7^3 = 7^{5}$

**3**

Write $(2^4)^3$ as a single power of 2.

$\underbrace{2^4 \times 2^4 \times 2^4}_{\text{3 lots}}$

4 + 4 + 4 = 12

A power of a power: multiply the powers.

$(2^4)^3 = 2^{12}$

**4**

Work out $6^5 \div 6^5$. Write it as a power of 6, then as a number.

Divide, so subtract the powers.

$6^5 \div 6^5 = 6^{0} = 1$

**5**

Simplify $2x^3 \times 6x^4$

Numbers 2 × 6 = 12

Powers 3 + 4 = 7

Answer $12x^7$

**6**

Simplify $\frac{18y^9}{3y^5}$

Numbers 18 ÷ 3 = 6

Powers 9 − 5 = 4

Answer $6y^4$

**7**

Simplify $(m^5)^2 \times m^3$

$(m^5)^2 = m^{10}$

$m^{10} \times m^3 = m^{13}$

Answer $m^{13}$

**8**

Kai writes $(3x^2)^4 = 3x^8$.

Explain what Kai has done wrong.

Then write the right answer.

Kai did not work out $3^4$

$3^4 = 3 \times 3 \times 3 \times 3 = 81$

Answer $81x^8$

# Index Laws *further practice*

ANSWERS

**9**

Simplify

$$7p^3 \times 3p^6$$

$7 \times 3 = 21$

$3 + 6 = 9$

Answer $21p^9$

**10**

Simplify

$$\frac{24t^{10}}{6t^4}$$

$24 \div 6 = 4$

$10 - 4 = 6$

Answer $4t^6$

**11**

Write an expression for the area of this rectangle. Simplify it.




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

$4 \times 3 = 12, \quad 3 + 5 = 8$

Area = $12x^8$ cm$^2$

**12**

A collector has $3^7$ stamps. Each page of her album holds $3^3$ stamps.
How many pages does she fill?
Give your answer as a power of 3 and as an ordinary number.

$3^7 \div 3^3$

$7 - 3 = 4$

Answer $3^4 = 81$ pages

**13**

Which is bigger? Show how you know.

$$(2^3)^4 \text{ or } 2^5 \times 2^6$$

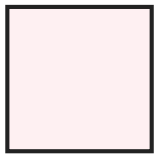
$(2^3)^4 = 2^{12}$

$2^5 \times 2^6 = 2^{11}$

Answer $(2^3)^4$, as $2^{12} > 2^{11}$

**14**

This square has sides of the length shown. Find its area. Simplify your answer.




$(3x^4)^2$

$3^2 = 9, \quad 4 \times 2 = 8$

Area = $9x^8$ cm$^2$

**15**

Simplify fully

$$\frac{(2x^3)^2 \times 5x^4}{10x^6}$$

top: $4x^6 \times 5x^4 = 20x^{10}$

$20x^{10} \div 10x^6$

Answer $2x^4$

**16**

Ella says $9^0 = 0$, because there are no nines. Is Ella right?
Explain how you know.

$9^2 \div 9^2 = 1$, anything ÷ itself

and by the powers, $9^2 \div 9^2 = 9^0$

Answer No, $9^0 = 1$