Powers of powers

Maths

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Powers of powers

1. Simplify each expression.
a) $(2^3)^7$
b) $(13^5)^3$
c) $(1352^6)^8$
d) $(7^{100})^2$

2. Write each expression as a single power of 5
a) $(5^6)^{-2}$

c) $(5^{-3})^{-4}$

b) $(5^{-2})^7$

d) $(5^{-5})^{-5}$

3. State whether each is true or false.

a) $(3^4)^3 \times 3^3 = 9^{15}$

b) $(2^5)^5 \times 2^{25} = 2^{50}$

c) $4^3 \times 4^5 \times (4^4)^2 = 4^{16}$

d) $(13^{10})^{0.5} = 13^{10.5}$

For any false statements work out the correct answer.

Powers of powers

4. For each expression find the value of m.
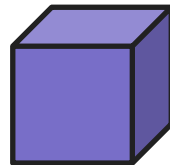
a) $(m^3)^4 = 19^{12}$

b) $(12^m)^3 = 12^6$

c) $(83^{-5})^m = 83^{15}$

d) $(7^9)^m = 7^{4.5}$

5. A cube has a side length of 7^9 mm. Calculate the volume of the cube. Give your answer as a single power of 7

7^9 mm

6. Show that $\left(\dfrac{6^2 \times 6^8}{6^3} \right)^4 = 6^{28}$

Answers

Powers of powers

1. Simplify each expression.

a) $(2^3)^7$ 2^{21}

b) $(13^5)^3$ 13^{15}

c) $(1352^6)^8$ 1352^{48}

d) $(7^{100})^2$ 7^{200}

2. Write each expression as a single power of 5

a) $(5^6)^{-2}$ 5^{-12} c) $(5^{-3})^{-4}$ 5^{12}

b) $(5^{-2})^7$ 5^{-14} d) $(5^{-5})^{-5}$ 5^{25}

3. State whether each is true or false.

a) $(3^4)^3 \times 3^3 = 9^{15}$ False. 3^{15}

b) $(2^5)^5 \times 2^{25} = 2^{50}$ True

c) $4^3 \times 4^5 \times (4^4)^2 = 4^{16}$ True

d) $(13^{10})^{0.5} = 13^{10.5}$ False. 13^5

For any false statements work out the correct answer.

Powers of powers

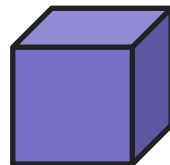4. For each expression find the value of m.

a) $(m^3)^4 = 19^{12}$

$m = 19$

b) $(12^m)^3 = 12^6$

$m = 2$

c) $(83^{-5})^m = 83^{15}$

$m = -3$

$m = 0.5$

d) $(7^9)^m = 7^{4.5}$

5. A cube has a side length of 7^9 mm. Calculate the volume of the cube. Give your answer as a single power of 7

7^9 mm

$(7^9)^3 = 7^{27}$ mm^3

6. Show that $\left(\dfrac{6^2 \times 6^8}{6^3}\right)^4 = 6^{28}$

$6^2 \times 6^8 = 6^{10}$ $6^{10} \div 6^3 = 6^7$ $(6^7)^4 = 6^{28}$