



Manipulating powers (3)

Getting ready for A-Level Maths...

What you need...

- Your brain and attention
- A device to watch connected to internet
- A pen and paper
- Can do attitude

Manipulating powers (3)

Important rules

$$a^1 = a$$

$$a^0 = 1$$

$$a^m \times a^n = a^{m+n}$$

$$a^m \div a^n = \frac{a^m}{a^n} = a^{m-n}$$

$$(a^m)^n = a^{mn}$$

$$(ka^m)^n = k^n a^{mn}$$

$$a^{-m} = \frac{1}{a^m}$$

$$a^{\frac{1}{m}} = \sqrt[m]{a}$$

$$a^{\frac{n}{m}} = \left(\sqrt[m]{a}\right)^n$$

Manipulating powers (3)

My turn

Express 81^{3x} as a power of 3 in terms of x .

Your turn

Express 64^{7x} as a power of 2 in terms of x .

Manipulating powers (3)

My turn

Express 25×125^{3x} as a power of 5 in terms of x .

Your turn

Express 27×243^{2x} as a power of 3 in terms of x .

Manipulating powers (3)

My turn

Express $8 \times \frac{1}{32^{4x}}$ as a power of 2 in terms of x .

Your turn

Express $25 \times \frac{1}{625^{2x}}$ as a power of 5 in terms of x .

Manipulating powers (3)

My turn

Express $32 \times 16^{x-5}$ as a power of 2 in terms of x .

Your turn

Express $81 \times 27^{x-4}$ as a power of 3 in terms of x .

Manipulating powers (3)

My turn

$27^m \times 81^n$ can be written in the form 3^a . Express a in terms of m and n .

Your turn

$32^m \times 128^n$ can be written in the form 2^a . Express a in terms of m and n .

Manipulating powers (3)

My turn

$\frac{64}{\sqrt[6]{8^n}}$ can be written in the form 2^a .

Express a in terms of n .

Exam Q

Your turn

$\frac{32}{\sqrt[4]{4^n}}$ can be written in the form 2^a .

Express a in terms of n .

Exam Q

Manipulating powers (3)

Review Exercise

1. Express 25^{4x} as a power of 5 in terms of x .
2. Express 16×128^{2x} as a power of 2 in terms of x .
3. Express $9 \times \frac{1}{81^{3x}}$ as a power of 3 in terms of x .
4. Express $64 \times 8^{x-4}$ as a power of 2 in terms of x .
5. $64^m \times 16^n$ can be written in the form 2^a . Express a in terms of m and n .
6. $\frac{27}{\sqrt[6]{9^n}}$ can be written in the form 3^a . Express a in terms of n .

Extra Practice

7. $8^m \div 32^n$ can be written in the form 2^a . Express a in terms of m and n .
8. $(27^m)^{4n}$ can be written in the form 3^a . Express a in terms of m and n .
9. $\sqrt[3]{9} \times 81^n$ can be written in the form 3^a . Express a in terms of n .
10. $\frac{\sqrt[3]{32}}{16^n}$ can be written in the form 2^a . Express a in terms of n .

Manipulating powers (3)

Review Exercise (Answers)

- Express 25^{4x} as a power of 5 in terms of x . 5^{8x}
- Express 16×128^{2x} as a power of 2 in terms of x . 2^{14x+4} or 2^{4+14x}
- Express $9 \times \frac{1}{81^{3x}}$ as a power of 3 in terms of x . 3^{-12x+2} or 3^{2-12x}
- Express $64 \times 8^{x-4}$ as a power of 2 in terms of x . 2^{3x-6} or 2^{-6+3x}
- $64^m \times 16^n$ can be written in the form 2^a . Express a in terms of m and n . $a=6m+4n$ or $a=4n+6m$
- $\frac{27}{\sqrt[6]{(9^n)}}$ can be written in the form 3^a . Express a in terms of n . $a=-\frac{n}{3}+3$ or $a=3-\frac{n}{3}$

Extra Practice

- $8^m \div 32^n$ can be written in the form 2^a . Express a in terms of m and n . $a=3m-5n$ or $a=-5n+3m$
- $(27^m)^{4n}$ can be written in the form 3^a . Express a in terms of m and n . $a=12mn$ or $a=12nm$
- $\sqrt[3]{9} \times 81^n$ can be written in the form 3^a . Express a in terms of n . $a=\frac{2}{3}+4n$ or $a=4n+\frac{2}{3}$
- $\frac{\sqrt[3]{32}}{16^n}$ can be written in the form 2^a . Express a in terms of n . $a=\frac{5}{3}-4n$ or $a=-4n+\frac{5}{3}$