

Fractional Negative Indices

GCSE Maths · Written to the shared content for AQA, Edexcel and OCR

Name _____ Class _____ Date _____

1. Worked example

Work out 5^{-2} .

Step 1 · Negative index means 'one over'

$$5^{-2} = 1/5^2$$

Step 2 · Square the 5

$$= 1/25$$

Answer: $1/25$

Check: $5^2 \times 5^{-2} = 5^0 = 1$, and $25 \times 1/25 = 1$ ✓

2. Now try one with the steps

Work out $27^{(2/3)}$.

Step 1 · Denominator 3 → cube root

Step 2 · Numerator 2 → square

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. Work out 2^{-3} fraction. [1]

2. Write 10^{-2} decimal. [1]

3. Work out $(1/4)^{-1}$. [1]

4. Work out $49^{(1/2)}$. [1]

5. Work out $64^{(1/3)}$. [1]

6. Work out $81^{(1/4)}$. [1]

7. Work out $8^{(2/3)}$. [2]

8. Work out $25^{(3/2)}$. [2]

9. Work out $16^{(-1/2)}$ fraction. [2]

10. Work out $32^{(-3/5)}$ fraction. [2]

11. Work out $(8/27)^{(2/3)}$ fraction. [2]

12. Work out $(9/4)^{(-3/2)}$ fraction. [3]

13. Simplify $x^{(1/2)} \times x^{(3/2)}$. [1]

14. Simplify $(27x^6)^{(2/3)}$. [2]

15. Solve $9^x = 1/27$. Give x fraction.

[3]

4. Before you hand it in

$2^{-3} = -8$

A negative index means the reciprocal, not a negative number: $2^{-3} = 1/8$.

$8^{(2/3)} = 8 \times 2/3 = 16/3$

The index is not a multiplier. Denominator = root, numerator = power: $(\sqrt[3]{8})^2 = 4$.

$16^{(1/2)} = 8$

Power $\frac{1}{2}$ is the square root: $\sqrt{16} = 4$. ($16 \div 2 = 8$ is a different thing.)

$(2/3)^{-2} = -4/9$ or $1/(4/9)$ left unsimplified

Flip the fraction, then apply the power: $(2/3)^{-2} = (3/2)^2 = 9/4$.