Indices: Fractional Powers

ANSWERS

1

Work out $125^{\frac{2}{3}}$

the bottom is the root

5

the top is the power

25

Answer 25

2

Work out $16^{\frac{3}{2}}$

the bottom is the root

4

the top is the power

64

Answer 64

3

Work out $81^{\frac{3}{4}}$

the bottom is the root

3

the top is the power

27

Answer 27

4

Work out $4^{\frac{5}{2}}$

the bottom is the root

2

the top is the power

32

Answer 32

5

Work out $27^{-\frac{2}{3}}$

the minus means one over

$= \frac{1}{27^{\frac{2}{3}}}$

the bottom is the root

3

the top is the power

9

Answer $\frac{1}{9}$

6

Work out $\left(\frac{8}{27}\right)^{\frac{2}{3}}$

cube root: $\frac{2}{3}$, then square

Answer $\frac{4}{9}$

7

Jo says $36^{\frac{1}{2}} = 18$.
Explain Jo's mistake, then find the right answer.

halving is not a square root

Answer 6

8

Write $\sqrt[3]{5}$ as a power of 5.

cube root, so the bottom is 3

Answer $5^{\frac{1}{3}}$

Indices: Fractional Powers *further practice*

ANSWERS

9

Work out

$$100^{-\frac{3}{2}}$$

$\sqrt{100} = 10$, then 1 over 10^3

Answer $\frac{1}{1000}$

10

Work out

$$\left(\frac{27}{64}\right)^{-\frac{2}{3}}$$

flip: $\frac{64}{27}$, root: $\frac{4}{3}$

Answer $\frac{16}{9}$

11

Write in order, smallest first.

$$49^{\frac{1}{2}} \quad 4^{\frac{3}{2}} \quad 125^{-\frac{1}{3}} \quad 81^{\frac{1}{4}}$$

$\frac{1}{5}$, 3, 7, 8

Order $125^{-\frac{1}{3}}$, $81^{\frac{1}{4}}$, $49^{\frac{1}{2}}$, $4^{\frac{3}{2}}$

12

The time, T seconds, for one swing of a pendulum L metres long is about the formula below. Find T when $L = 2.25$

$$T = 2 \times L^{\frac{1}{2}}$$

$\sqrt{2.25} = 1.5$

Answer 3 seconds

13

Find the value of x.

$$8^x = \frac{1}{4}$$

$8 = 2^3$, $4 = 2^2$, one over

Answer $x = -\frac{2}{3}$

14

The number of cells, N, in a sample t hours after it is set up is given by the formula below. How many cells are there after 90 minutes?

$$N = 32 \times 4^t$$

$t = \frac{3}{2}$, $4^{\frac{3}{2}} = 8$

Answer 256

15

A cube has a volume of $\frac{125}{8}$ cm³.

Use fractional powers to find its total surface area.

one face: $\left(\frac{125}{8}\right)^{\frac{2}{3}} = \frac{25}{4}$

Answer 37.5 cm²

16

Ali says $16^{-\frac{1}{2}} = -8$. He has made two mistakes. Explain them, then find the right answer.

he halved, and the minus means one over

Answer $\frac{1}{4}$