

Fractional indices

Maths

Mr Chan



Fractional indices

1. Amy is considering fractional powers.

Here is her working.

$$\begin{aligned} 25^{\frac{1}{2}} \times 25^{\frac{1}{2}} &= 25^1 \\ \text{so } 25^{\frac{1}{2}} &= \sqrt{25} = 5 \end{aligned}$$

Use this reasoning to work out

a) $9^{\frac{1}{2}}$

b) $100^{\frac{1}{2}}$

c) $27^{\frac{1}{3}}$

d) $16^{\frac{1}{4}}$

2. Work out.

a) $9^{\frac{1}{2}} + 81^{\frac{1}{2}}$

c) $125^{\frac{1}{3}} + 625^{\frac{1}{4}}$

b) $27^{\frac{1}{3}} - 16^{\frac{1}{4}}$

d) $25^{\frac{1}{2}}(27^{\frac{1}{3}} + 16^{\frac{1}{4}})$



Fractional indices

3. Write each of the following in index form.

a) $\sqrt[3]{a}$

b) $\sqrt[5]{b}$

c) $\sqrt[7]{c}$

d) \sqrt{d}

4. Arrange the following cards in ascending order.

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

$$16^{\frac{1}{2}}$$

$$2^3$$

$$8^{\frac{1}{3}}$$

$$2^{-1}$$



Answers



Fractional indices

1. Amy is considering fractional powers.

Here is her working.

$$25^{\frac{1}{2}} \times 25^{\frac{1}{2}} = 25^1$$
$$\text{so } 25^{\frac{1}{2}} = \sqrt{25} = 5$$

Use this reasoning to work out

a) $9^{\frac{1}{2}}$ 3

b) $100^{\frac{1}{2}}$ 10

c) $27^{\frac{1}{3}}$ 3

d) $16^{\frac{1}{4}}$ 2

2. Work out.

a) $9^{\frac{1}{2}} + 81^{\frac{1}{2}}$

12

c) $125^{\frac{1}{3}} + 625^{\frac{1}{4}}$

10

b) $27^{\frac{1}{3}} - 16^{\frac{1}{4}}$

1

d) $25^{\frac{1}{2}}(27^{\frac{1}{3}} + 16^{\frac{1}{4}})$

25



Fractional indices

3. Write each of the following in index form.

a) $\sqrt[3]{a}$ $a^{\frac{1}{3}}$

b) $\sqrt[5]{b}$ $b^{\frac{1}{5}}$

c) $\sqrt[7]{c}$ $c^{\frac{1}{7}}$

d) \sqrt{d} $d^{\frac{1}{2}}$

4. Arrange the following cards in ascending order.

$$2^{-1}$$

$$8^{\frac{1}{3}}$$

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

$$16^{\frac{1}{2}}$$

$$2^3$$

