



Fractional Indices Worksheet

- 1 Match each of the cards so that those that are equivalent are together.
Put each set of three cards in the table together.

| | | | | | |
|--------------------|------------|-------------------|--|--|--|
| 2 | $\sqrt{9}$ | $4^{\frac{1}{2}}$ | | | |
| 3 | $\sqrt{4}$ | $\sqrt[3]{64}$ | | | |
| $64^{\frac{1}{3}}$ | 4 | $9^{\frac{1}{2}}$ | | | |

- 2 For each of the following statements circle if they are true or false.
If your answer is false, write down the correct answer.

a) $\sqrt{4} = 4^{\frac{1}{2}}$ **True / False**

b) $\sqrt{10} = 10^{\frac{1}{2}}$ **True / False**

c) $\sqrt[3]{8} = 8^{\frac{1}{3}}$ **True / False**

d) $\sqrt{100} = 10^{\frac{1}{2}}$ **True / False**

e) $\sqrt{16} = \sqrt[3]{64}$ **True / False**

Example

Evaluate $32^{\frac{3}{5}}$

$$32^{\frac{3}{5}} = \left(\sqrt[5]{32}\right)^3$$

$$\sqrt[5]{32} = 2 \text{ because } 2 \times 2 \times 2 \times 2 \times 2 = 32$$

$$\left(\sqrt[5]{32}\right)^3 = 2^3 = 8$$

- 3 Evaluate each of the following

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

b) $25^{\frac{1}{2}}$

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

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

e) $32^{\frac{1}{5}}$

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

g) $8^{\frac{2}{3}}$

h) $8^{\frac{3}{3}}$

i) $8^{\frac{4}{3}}$

j) $8^{\frac{5}{3}}$

k) $64^{\frac{1}{2}}$

l) $64^{\frac{1}{3}}$

m) $64^{\frac{1}{6}}$

n) $64^{\frac{2}{6}}$

o) $64^{\frac{5}{6}}$



Fractional Indices Worksheet ANSWERS

- 1 Match each of the cards so that those that are equivalent are together.
Put each set of three cards in the table together.

| | | | | | |
|--------------------|------------|-------------------|---|-----------------|--------------------|
| 2 | $\sqrt{9}$ | $4^{\frac{1}{2}}$ | 2 | $\sqrt{4}$ | $4^{\frac{1}{2}}$ |
| 3 | $\sqrt{4}$ | ${}^3\sqrt{64}$ | 3 | $\sqrt{9}$ | $9^{\frac{1}{2}}$ |
| $64^{\frac{1}{3}}$ | 4 | $9^{\frac{1}{2}}$ | 4 | ${}^3\sqrt{64}$ | $64^{\frac{1}{3}}$ |

- 2 For each of the following statements write if they are true or false.
If your answer is false, write down the correct answer.

| | |
|-------------------------------------|------|
| a) $\sqrt{4} = 4^{\frac{1}{2}}$ | True |
| b) $\sqrt{10} = 10^{\frac{1}{2}}$ | True |
| c) ${}^3\sqrt{8} = 8^{\frac{1}{3}}$ | True |
| d) $\sqrt{100} = 10^{\frac{1}{2}}$ | True |
| e) $\sqrt{16} = {}^3\sqrt{64}$ | True |

Example

Evaluate $32^{\frac{3}{5}}$

$$32^{\frac{3}{5}} = \left({}^5\sqrt{32}\right)^3$$

${}^5\sqrt{32} = 2$ because $2 \times 2 \times 2 \times 2 \times 2 = 32$

$$\left({}^5\sqrt{32}\right)^3 = 2^3 = 8$$

- 3 Evaluate each of the following

a) $16^{\frac{1}{2}} = 4$ b) $25^{\frac{1}{2}} = 5$ c) $27^{\frac{1}{3}} = 3$ d) $16^{\frac{1}{4}} = 2$ e) $32^{\frac{1}{5}} = 2$

f) $8^{\frac{1}{3}} = 2$ g) $8^{\frac{2}{3}} = 4$ h) $8^{\frac{3}{3}} = 8$ i) $8^{\frac{4}{3}} = 16$ j) $8^{\frac{5}{3}} = 32$

k) $64^{\frac{1}{2}} = 8$ l) $64^{\frac{1}{3}} = 4$ m) $64^{\frac{1}{6}} = 2$ n) $64^{\frac{2}{6}} = 4$ o) $64^{\frac{5}{6}} = 32$