

## Summary: Rules on indices

$$\sqrt{\frac{16}{4}} = \sqrt{4} = 2$$

$$\text{Also, } \sqrt{\frac{16}{4}} = \frac{\sqrt{16}}{\sqrt{4}} = \frac{4}{2} = 2$$

Both methods above are equivalent and you use whichever methods you find it easy.

So, generally,

$$\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}} \text{ or } \frac{\sqrt{a}}{\sqrt{b}} = \sqrt{\frac{a}{b}} \text{ use whichever method is easy.}$$

*More Facts on indices:*

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

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

$$a^{\frac{m}{n}} = \sqrt[n]{a^m} \text{ or } a^{\frac{m}{n}} = \sqrt[n]{a^m}$$

Can you see why the first method is easier even though they give the same answer

$$a^{m \cdot n} = a^{mn}$$

$$a^{\frac{1}{2}} = \sqrt{a}$$

Example,

$$8^{\frac{2}{3}} = \sqrt[3]{8^2} = 2^2 = 4 \text{ or } 8^{\frac{2}{3}} = \sqrt[3]{8^2} = \sqrt[3]{64} = 4$$

Which of the two methods is easier and why?

**Challenge:** Can you show why  $a^{\frac{1}{2}} = \sqrt{a}$  or  $a^0 = 1$