Square Roots of Fractions

We have seen previously how $3^2 = 9$ indicates that $\sqrt{9} = 3$.

In the same way, $\left(\frac{2}{5}\right)^2 = \frac{4}{25}$ indicates that $\sqrt{\frac{4}{25}} = \frac{2}{5}$.

However, $\frac{\sqrt{4}}{\sqrt{25}} = \frac{2}{5}$ also.

So, we observe that $\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$ for positive numbers a and b.

Example

Find **a** $\sqrt{\frac{4}{9}}$ **b** $\sqrt{2\frac{1}{4}}$

a $\sqrt{\frac{4}{9}} = \frac{\sqrt{4}}{\sqrt{9}} = \frac{2}{3}$

b $\sqrt{2\frac{1}{4}} = \sqrt{\frac{9}{4}} = \frac{\sqrt{9}}{\sqrt{4}} = \frac{3}{2} = 1\frac{1}{2}$

1 Copy and complete:

a Since $\left(\frac{1}{2}\right)^2 = \frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$, $\sqrt{\frac{1}{4}} = \frac{\square}{\square}$

b Since $\left(\frac{2}{3}\right)^2 = \frac{\square}{\square} = \frac{\square}{\square}$ $\sqrt{\frac{\square}{\square}} = \frac{2}{3}$

c Since $\left(\frac{3}{7}\right)^2 = \frac{\square}{\square} = \frac{\square}{\square}$ $\sqrt{\frac{\square}{\square}} = \frac{\square}{\square}$

2 Find:

a $\sqrt{\frac{1}{9}}$ **b** $\sqrt{\frac{1}{16}}$ **c** $\sqrt{\frac{1}{121}}$ **d** $\sqrt{\frac{4}{25}}$ **e** $\sqrt{\frac{9}{16}}$ **f** $\sqrt{\frac{16}{49}}$

g $\sqrt{\frac{25}{9}}$ **h** $\sqrt{\frac{25}{4}}$ **i** $\sqrt{\frac{81}{100}}$ **j** $\sqrt{\frac{100}{49}}$ **k** $\sqrt{\frac{9}{121}}$ **l** $\sqrt{\frac{36}{169}}$

3 Find:

a $\sqrt{6\frac{1}{4}}$ **b** $\sqrt{1\frac{7}{9}}$ **c** $\sqrt{1\frac{9}{16}}$ **d** $\sqrt{5\frac{4}{9}}$ **e** $\sqrt{3\frac{1}{16}}$ **f** $\sqrt{11\frac{1}{9}}$

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