$\sqrt{x} = (x)^{\frac{1}{2}}$

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(a) Skriv om VL med hjälp av potenslagar:

$a \cdot a^{\frac{1}{2}} = a^1 \cdot a^{\frac{1}{2}} = a^{1+\frac{1}{2}}$

$$\sqrt{\frac{a}{b}\sqrt{\frac{a}{b}}} = \left(\frac{a}{b}\left(\frac{a}{b}\right)^{\frac{1}{2}}\right)^{\frac{1}{2}} = \left(\frac{a}{b}\cdot\frac{a^{\frac{1}{2}}}{b^{\frac{1}{2}}}\right)^{\frac{1}{2}} = \left(\frac{a^{\frac{3}{2}}}{b^{\frac{3}{2}}}\right)^{\frac{1}{2}}$$

$$= \frac{a^{\frac{3}{2}\cdot\frac{1}{2}}}{b^{\frac{3}{2}\cdot\frac{1}{2}}} = \frac{a^{\frac{3}{4}}}{b^{\frac{3}{4}}} = \left(\frac{a}{b}\right)^{\frac{3}{4}}$$

Alltså måste $x = \frac{3}{4}$ (Svar)

(b) Skriv om VL:

$$\sqrt{\frac{a}{b}\sqrt{\frac{b}{a}\sqrt{\frac{a}{b}}}} = \left[\frac{a}{b}\left(\frac{b}{a}\left(\frac{a}{b}\right)^{\frac{1}{2}}\right)^{\frac{1}{2}}\right]^{\frac{1}{2}} = \left[\frac{a}{b}\left(\frac{b}{a}\cdot\frac{a^{\frac{1}{2}}}{b^{\frac{1}{2}}}\right)^{\frac{1}{2}}\right]^{\frac{1}{2}}$$

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

alt. $\frac{a^{\frac{1}{2}}}{a} = \frac{a^{\frac{1}{2}}}{a^{\frac{1}{2}}\cdot a^{\frac{1}{2}}} = \frac{1}{a^{\frac{1}{2}}}$

$$= \left[\frac{a}{b}\left(\frac{b^{\frac{1}{2}}}{a^{\frac{1}{2}}}\right)^{\frac{1}{2}}\right]^{\frac{1}{2}} = \left[\frac{a}{b}\,\frac{b^{\frac{1}{4}}}{a^{\frac{1}{4}}}\right]^{\frac{1}{2}}$$

$$= \left[\frac{a^{\frac{3}{4}}}{b^{\frac{3}{4}}}\right]^{\frac{1}{2}} = \frac{a^{\frac{3}{8}}}{b^{\frac{3}{8}}} = \left(\frac{a}{b}\right)^{\frac{3}{8}}$$

Alltså måste $x = \frac{3}{8}$ (Svar)