

Method 1

$$\begin{aligned}\sqrt{32} &= \sqrt{16 \times 2} \\ &= \sqrt{16} \times \sqrt{2} \\ &= 4\sqrt{2}\end{aligned}$$

Method 2

$$\begin{aligned}\sqrt{32} &= \sqrt{2 \times 16} \\ &= \sqrt{2 \times 2 \times 8} \\ &= \sqrt{2 \times 2 \times 2 \times 4} \\ &= \sqrt{2 \times 2 \times 2 \times 2 \times 2} \\ &= \sqrt{2 \times 2} \times \sqrt{2 \times 2} \times \sqrt{2} \\ &= 2 \times 2 \times \sqrt{2} \\ &= 4\sqrt{2}\end{aligned}$$