Connecting fractional powers with roots

6 questions | 13 marks

Equivalent correct methods earn the corresponding marks.

1. Write $\sqrt{x}$ as a power, where $x \geq 0$. [2 marks]

A square root has index $\frac{1}{2}$.

Answer: $x^{\frac{1}{2}}$

2. Write $a^{\frac{4}{3}}$ in root notation for $a > 0$. [2 marks]

Take the cube root, then raise it to the fourth power.

Answer: $(\sqrt[3]{a})^4$

3. Evaluate $125^{\frac{2}{3}}$. [2 marks]

$\sqrt[3]{125} = 5$, then $5^2 = 25$.

Answer: 25

4. Evaluate $16^{-\frac{3}{4}}$. [2 marks]

$16^{\frac{1}{4}} = 2$, $2^3 = 8$, and the negative power gives $\frac{1}{8}$.

Answer: $\frac{1}{8}$

5. Evaluate $\sqrt[3]{-216}$. [2 marks]

$(-6)^3 = -216$.

Answer: -6

6. Explain why $(-9)^{\frac{1}{2}}$ is not a real number. [3 marks]

If u is real then $u^2 \geq 0$, so no real u has $u^2 = -9$.

Answer: No real square is negative.