Solutions

Award method and answer marks as indicated; accept equivalent correct methods.

2.1

- $12^2 = 12 \times 12 = \mathbf{144}$; $15^2 = 225$, so $\sqrt{225} = \mathbf{15}$.

2.2

- $5^3 = 5 \times 5 \times 5 = \mathbf{125}$; $(-3)^3 = -27$, so the cube root is -3.

2.3

- Four factors give $3^4 = \mathbf{81}$. Since $2^4 = 16$, the positive fourth root is $\mathbf{2}$.

2.4

- Powers and roots first: $Q = 8 \times 7 = \mathbf{56}$.

3.1

(a)

- $s^2 = A$, so $s = \sqrt{196} = \mathbf{14}$ cm.

(b)

- $e^3 = V$, so $e = \sqrt[3]{1000} = \mathbf{10}$ cm.

(c)

- $L = 4s + 12e = 4(14) + 12(10) = \mathbf{176}$ cm.

3.2

(a)

- A square has $A = s^2$, so $s = \sqrt{A} = \sqrt{144} = \mathbf{12}$ cm.
- A cube has $V = e^3$, so $e = \sqrt[3]{216} = \mathbf{6}$ cm; square root for area, cube root for volume.

(b)

- $(-4)^2 = (-4)(-4) = \mathbf{16}$, while $-4^2 = -(4 \times 4) = \mathbf{-16}$.
- The brackets include the negative sign in the base; without them, the power is evaluated first.

3.3

- $8^2 = 64$ and $9^2 = 81$, and $64 < 70 < 81$.
- So $\sqrt{70}$ lies between **8** and **9**.

3.4

(a)

- $5 \times 5 \times 5 = 125$, so $n = \mathbf{3}$.

(b)

- $\sqrt{16} = 4$, so $4^3 = 64$; and $2^5 = 32$.
- $64 - 32 = \mathbf{32}$.