## Solutions

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

**2.1**

- Zero index gives **1**; $2^{-3} = 1/2^3 = \mathbf{1/8}$.

**2.2**

- Add indices: $Q = 3^{2+3} = 3^5 = \mathbf{243}$.

**2.3**

- Subtract indices: $Q = 2^{3-5} = 2^{-2} = \mathbf{1/4}$.

**2.4**

- Multiply indices: $Q = 5^{2\times 2} = 5^4 = \mathbf{625}$.

**3.1**

(a)

- $Q = 10^{4+(-2)} = \mathbf{10^2}$.

(b)

- $R = 10^{2-5} = \mathbf{10^{-3}}$.

(c)

- $S = 100 + 0.001 = \mathbf{100.001}$.

**3.2**

(a)

- For A, use $a^m a^n = a^{m+n}$: $A = 2^{5-2} = \mathbf{8}$.
- For B, $B = 1 + 1/4 = \mathbf{5/4}$.

(b)

- The rule for multiplying powers does not apply to the plus sign between A and B.
- Use the evaluated values: $S = A + B = 8 + 5/4 = \mathbf{37/4}$.

**3.3**

- Multiplying adds the indices and dividing subtracts them: $3 + 4 - 2 = 5$.
- $\mathbf{5^5}$.

**3.4**

(a)

- $n + 2 = 7$, so $n = \mathbf{5}$.

(b)

- $4^{-2} = \frac{1}{4^2} = \frac{1}{16}$ and $7^0 = 1$.
- $\frac{1}{16} + 1 = \mathbf{\frac{17}{16}}$.