Solutions

Each answer shows the steps, then the **result**.

2.1

- The mixture is at equilibrium

2.2

- Forward (toward products)

2.3

- Q uses the current concentrations; K uses the equilibrium concentrations

3.1 B

- too many products, so it shifts reverse

3.2

(a)

- $Q > K$ $(120 > 50)$

(b)

- Shifts reverse (toward reactants), because there is more product than equilibrium allows, so Q must fall to K

3.3

- $Q = \dfrac{[\mathrm{B}]}{[\mathrm{A}]} = \dfrac{2}{2} = 1$; $Q < K$ $(1 < 4)$, so it shifts **forward** to make more B