1) 31 200 J

2) -31 700 J

3) 120°C

4) 28°C

5) 1100 J

6) 14 900 J

7) 0.046 J/g °C

8) 424 g

9) 2.60 J/g °C

10) 6.21 J

11) 42.6 L

① $m = 150.0\,g$

$T_i = 25.3°C$

$T_f = 75.0°C$

$C = 4.19\ \frac{J}{g \cdot °C}$

$q = ?$

$q = mC\Delta T$

$q = (150.0\,g)(4.19\ \frac{J}{g \cdot °C})(49.7°C)$

$\boxed{q = 31\,200\ J}$

③ $m = 50.0\,g$

$T_i = 140°C$

$q = -2.5\,kJ$

$T_f = ?$

$C = 2.01\ \frac{J}{g \cdot °C}$

$q = mC\Delta T$

$q = mC(T_f - T_i)$

$-2500\ J = (50.0\,g)(2.01\ \frac{J}{g \cdot °C})(T_f - 140°C)$

$T_f - 140°C = \frac{-2500\ J}{(50.0\,g)(2.01\ \frac{J}{g \cdot °C})}$

$T_f - 140°C = -24.9°C$

$T_f = 24.9°C + 140°C$

$\boxed{T_f = 120°C}$