Given:
The food compartment of a refrigerator is maintained at 4°C by removing heat from it at a rate of 360 kJ/min.

Required:
If the required power input to the refrigerator is 2 kW, determine the coefficient of performance of the refrigerator and the rate of heat rejection to the room that houses the refrigerator.

Solution:
The heat supplied to the refrigerator cycle (that which is removed from the cooled space) is defined as

$$\dot{Q}_L := 360 \ \frac{kJ}{min}$$

The work supplied to the refrigerator is defined as

$$\dot{W}_{net,in} := 2 \ kW$$

The COP of the refrigerator is then given by

$$COP_R := \frac{\dot{Q}_L}{\dot{W}_{net,in}} = 3$$

The heat rejected by the refrigerator cyle is then found by

$$\dot{Q}_H := \dot{Q}_L + \dot{W}_{net,in} = 480 \ \frac{kJ}{min}$$