Given:
Heat is transferred to a heat engine from a furnace at a rate of 80 MW.

Required:
If the rate of waste heat rejection to a nearby river is 50 MW, determine the net power output and the thermal efficiency for this heat engine.

Solution:
The heat supplied to the heat engine is given as

$$\dot{Q}'_H := 80\ \text{MW}$$

The heat rejected by the heat engine is given as

$$\dot{Q}'_L := 50\ \text{MW}$$

The net work that the heat engine outputs is then found by

$$\boxed{\dot{W}'_{net,out} := \dot{Q}'_H - \dot{Q}'_L = 30\ \text{MW}}$$

The thermal efficiency is then found by

$$\boxed{\eta_{th} := \frac{\dot{W}'_{net,out}}{\dot{Q}'_H} = 37.5\ \%}$$