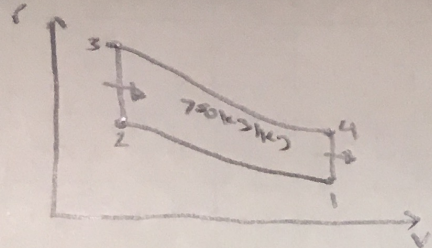


9.33)

a)



1-2

$$T_1 = 300 \text{ K}$$

$$v_1 = 214.07 \text{ KJ/kg}$$

$$v_{r1} = 621.2$$

$$v_{r2} = \frac{v_2}{v_1} v_{r1} = \frac{1}{6} v_{r1} = \frac{1}{6} (621.2) = 77.65$$

$$v_{r2} = 77.65$$

$$T_2 = 673.1 \text{ K}$$

$$v_2 = 491.2 \text{ KJ/kg}$$

$$\frac{P_2 v_2}{T_2} = \frac{P_1 v_1}{T_1}$$

$$P_2 = \frac{v_1}{v_2} \cdot \frac{T_2}{T_1} P_1 = (8) \left(\frac{673.1 \text{ K}}{300 \text{ K}} \right) (95 \text{ kPa}) = 1705 \text{ kPa}$$

• 2-3

$$q_{23, \text{in}} = v_3 - v_2$$

$$v_3 = v_2 + q_{23, \text{in}}$$

$$= 491.2 + 750 =$$

$$v_3 = 1241.2 \text{ KJ/kg}$$

$$T_3 = 1539 \text{ K}$$

$$v_{r3} = 6.5$$

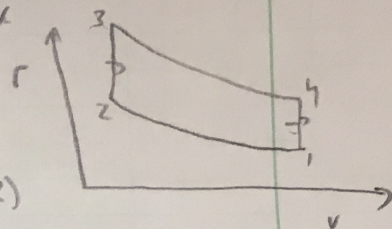
9.36) $r = \frac{v_1}{v_2} = \frac{v_1}{.016 v_1} = 10.20$

$T_2 = T_1 \left(\frac{v_1}{v_2} \right)^{k-1} = T_1 r^{k-1} = (565R)(10.20)^{1.4-1} = 1430.7R$

$T_4 = T_3 \left(\frac{v_3}{v_4} \right)^{k-1} = T_3 \left(\frac{1}{r} \right)^{k-1} = (2860R) \left(\frac{1}{10.20} \right)^{1.4-1} = 1129.4R$

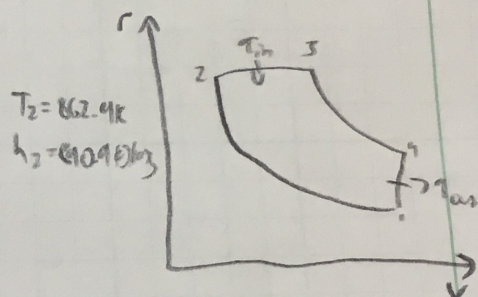
$W_{net} = C_v (T_3 - T_4) - C_v (T_2 - T_1)$

$= (.171 \text{ Btu/lbm} \cdot R)(2860 - 1129.4)R - (.0171 \text{ Btu/lbm} \cdot R)$



9.46)

1-2 $v_2 = \frac{v_1}{r} = \frac{1}{16} v_1 = \frac{1}{16} (21.2) = 1.325$



2-3

$\frac{P_3 v_3}{T_3} = \frac{P_2 v_2}{T_2} \Rightarrow T_3 = \frac{v_3}{v_2} T_2 = 2 T_2 = 2(862.4K) = 1724.8K$

9.57)

1-2

$T_2 = T_1 \left(\frac{v_1}{v_2} \right)^{k-1} = (343K)(22)^{1.4-1} = 1111K$

2-3

$\frac{P_3 v_3}{T_3} = \frac{P_2 v_2}{T_2} \Rightarrow T_3 = \frac{v_3}{v_2} T_2 = 1.6 T_2 = (1.6)(1111K) = 1777.6K$

