Review #2

3.28

R-134a (Table A-11)

a) $T = -8°C \quad P = 320\ kPa$

From Temp Table $P_{sat} = 217.08\ kPa$ @ $T_{sat} = -8°C$

State Compressed liquid

$v \approx v_f$ @ $T_{sat} = -8°C = 0.0007571\ m^3/kg$

b) $T = 30°C \quad v = 0.015\ m^3/kg$

$v_f = 0.0008421\ m^3/kg$

$v_g = 0.026622\ m^3/kg$

$v_f < v < v_g \Rightarrow$ saturated mixture

$$x = \frac{v - v_f}{v_g - v_f} = \frac{0.015 - 0.0008421}{(0.026622 - 0.0008421)}$$

$$= \underline{\underline{0.55}}$$

c) $P = 150\ kPa$ sat Vapor

From table A-12, $T_{sat} = -12.73°C$

$v = v_g = 0.11041\ m^3/kg$

d) $T = 80°C, \quad P = 600\ kPa$

$P < P_{sat}$ @ $T_{sat} = 80°C$ Superheated

Table A-13

$P = 0.6\ MPa \quad v = 0.044710\ m^3/kg$

$T = 80°C$

3.31

$$P_1 = \frac{(12\,kg)(9.81)}{\frac{\pi (0.25)^2}{4} \times \frac{1}{1000}} + P_{atm}$$

$$= 2.398172 + 88$$

$$= \underline{90.398\ kPa}$$

A-11 @ $T = -10°C$, $P_{sat} = 260.74\ kPa$

state 1 is superheated

A-13 $P = 0.09\ MPa$ ~~$P = 0.06\ MPa$~~

	$P = 0.1\ MPa$	0.09	$P = 0.06\ MPa$
v	$0.20743\ m^3/kg$	0.243193	$0.35048\ m^3/kg$
u	$241.3\ kJ/kg$	241.455	$241.92\ kJ/kg$

↑ Interpolation

a) Constant Pressure Process

$P_2 = 90.398\ kPa \approx 90\ kPa$.

$P_1 = 90\ kPa$.

b) $T_2 = 15°C$

u_2 = from Sh table doing double Interpolation

v_2 $0.254\ m^3/kg$

$u_2 = 245.5\ kJ/kg$

$\Delta u = 0.254 - 0.243 = 0.011\ m^3/kg$

$\Delta V = (0.85)(0.011) \simeq \underline{0.01\ m^3}$

$W = P\Delta V$