2.6 Adrienne's Lagrangian is

$$L = Z_A C_A + \lambda(Y_A - pZ_A - C_A).$$

Maximizing with respect to Z_A, C_A, and λ and solving, Adrienne's demand for good *Z* is

$$Z_A = \frac{Y_A}{2p}.$$

Stephen's Lagrangian is

$$L = (Z_S)^{0.5}(C_S)^{0.5} + \lambda(Y_S - pZ_S - C_S).$$

Maximizing with respect to Z_S, C_S, and λ and solving, Stephen's demand for good *Z* is

$$Z_S = \frac{Y_S}{2p}.$$

To find *p*, set the demands for good *Z* from both consumers equal to supply (which equals the endowment) and solve for *p*:

$$Z_A + Z_S = 30$$

$$\frac{Y_A}{2p} + \frac{Y_S}{2p} = 30.$$

Since $Y_A = 10p + 20$ and $Y_S = 20p + 10$,

$$10p + 20 + 20p + 10 = 30(2p)$$

$$30p = 30$$

$$p = \$1.$$

2.7 The contract curve is where each individual's *MRS* are equal to each other. Note that $MRS_t = -(H_t/G_t)$ and $MRS_m = -(H_m/2G_m)$. Also note that $G_t + G_m = 100$, and $H_t + H_m = 50$. As in Solved Problem 10.3, equating the *MRSs* and using the information about endowments given in the problem we get the following contract curve: $100G_m + 100H_m - H_mG_m = 0$.

2.8 The demands for each good are found to be $G_t = Y_t/2P$; $H_t = Y_t/2$; $G_m = Y_m/3P$; and $H_m = 2/3Y_m$. To find the price of *G* with the price of *H* normalized to 1, note that the sum of the individual demands for *G* equals the supply of *G*, as in Solved Problem 10.4, or $G_t + G_m = 100$. Substituting demands into this equation and rearranging yields the equilibrium price:

$$P = \frac{(H_t/200) + (H_m/300)}{(1 - (G_t/200) - (G_m/300))}.$$

Further simplifying,

$$p = \frac{3H_t + 2H_m}{600 - 3G_t - 2G_m}.$$

Substituting $100 - G_t$ for G_m and $50 - H_t$ for H_m and simplifying,

$$p = \frac{H_t + 100}{400 - G_t}.$$