Solutions to Midterm Exam

Part I

Qn.	Answer	Reference Page
1	b.	175
2.	c.	187
3.	b.	95
4.	b.	
5.	a.	113
6.	c.	123
7.	c.	123
8.	b.	129
9.	c.	
10.	d.	142
11.	c.	154
12.	c.	142
13.	a.	161
14.	d.	162-164
15.	c.	155-157
16.	a.	182
17.	b.	182
18.	b.	195
19.	c.	207
20.	a.	213
21.	c.	191
22.	d.	200
23.	a.	214
24.	d.	219
25.	b.	219

Part II

1. (a). $Q_y = 19 - 2Q_x$.

(b). In equilibrium, $\frac{MU_x}{MU_y} = \frac{P_x}{P_y}$,

or

$$\frac{1-2Q_x-Q_y}{8-2Q_y-Q_x} = 2.$$

Solving, $Q_x^* = 5$, $Q_y^* = 7$.

(c). Assumptions of nonsatiation, rationality.

4. (a). In equilibrium, $\frac{MU_x}{MU_y} = \frac{P_x}{P_y}$, or $\frac{MU_x}{MU_y} = 2$. This is true at the following quantities:

$x = 1; y = 4.$
$x = 2; y = 5.$
$x = 3; y = 6.$
$x = 4, y = 7.$
$x = 5; y = 8.$

The budget constraint is satisfied only at the bundle (3, 6).

(b). At (3,6), $MU_x/MU_y = P_x/P_y$, and $2(3) + 1(6) = 12$.
(c). To find the overall utility, add the marginal utilities of the first three units of x and the first six units of y. This is equal to 93.

5.(a). The AP is given by $AP = k_1x_1 - k_2x_1^2$. To find max AP we set the derivative of AP with respect to x_1 zero, and solve for x_1. AP reaches a maximum at $x_1 = k_1/2k_2$.
(b). The MP is given by $MP = 2k_1x_1 - 3k_2x_1^2$. To find the max AP we set the derivative of MP with respect to x_1 zero, and solve for x_1. MP reaches a maximum at $x_1 = k_1/3k_2$.
(c). Since $x_1, k_1, k_2 > 0$, $k_1/3k_2 < k_1/2k_2$. Therefore, MP reaches its maximum at a smaller input of x_1 than AP.