AP® Microeconomics
2003 Scoring Guidelines
Form B

Question 1

Correct Answers:
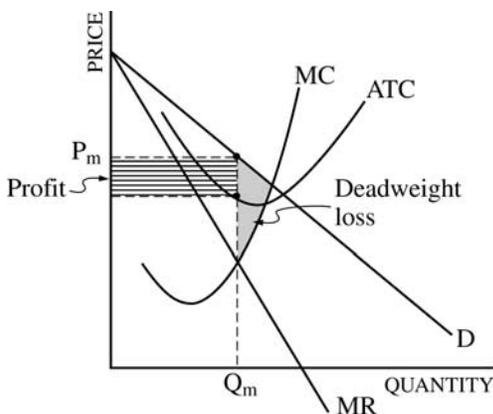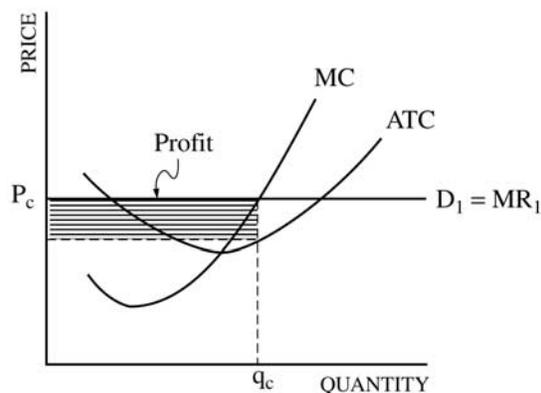
Monopoly   Perfect Competition

(a) The diagram above illustrates the graphs for a monopoly and a competitive firm earning short-run economic profits. The areas of economic profits are shaded with horizontal lines.

(b) The competitive firm is a price taker with a horizontal demand curve determined by the market equilibrium price. It can sell as many units as it wants at the market price, so it takes that price as its marginal revenue for each good. Price and marginal revenue are therefore the same. The monopoly faces a downward-sloping demand curve, meaning that it must lower its price in order to sell more units. When it lowers its price to sell another unit, its marginal revenue is the new price minus the loss it incurs by lowering its price on units previously sold at a higher price. Thus, marginal revenue is below price for a monopoly.

(c) Under perfect competition there are no barriers to entry, so in the long run new firms will enter when economic profits are being made. The entry of new firms increases market supply and lowers market price until the price falls to the level of minimum average total cost and zero economic profits are being made. Barriers to entry allow the monopoly to continue to earn economic profits even in the long run.

(d) The triangular shaded area in the monopoly graph represents the deadweight loss caused by the monopoly firm. The deadweight loss represents the loss of consumer and producer surplus caused by a suboptimal level of production at which marginal cost is below the price level.

Question 1 (cont'd)

Grading Rubric:

Question 1: 14 points

a) 8 points

Monopoly	Perfectly Competitive Firm
1 - Graph with downward D **and** MR below D	1 - Graph with horizontal D
1 - P from the demand curve	1 - P at intersection of D and MC/S
1- Q at MR=MC	1 - Q at MR=MC
1- Area of profit	1 - Area of profit

b) 2 points: (½ for each relationship and ½ for each explanation;)
   ½ point - P is the same as MR.
   ½ point - Because P is constant / firm is a price taker.
   ½ point - MR < P.
   ½ point - Because the firm must lower price (on all units) to sell more output.

c) 2 points: (one for competitive story and one for monopoly story)

   1 point – With perfect competition, the entry of new firms increases supply and decreases price to the level of minimum average total cost, resulting in zero economic profits.
   1point – For the monopoly, economic profits can continue in the long run due to barriers to entry.

d) 2 points:
   1 point - Correct area, including lost consumer surplus *and* lost producer surplus.
   1 point - Lost consumer and producer surplus due to suboptimal quantity/production where P>MC.

Question 2

Correct Answers:

(a) Before trade, the relevant curves are the domestic supply curve and the demand curve. The intersection of domestic supply and demand determines the equilibrium price and quantity, P_1 and Q_1. Consumer surplus is area H, above the price line and below the demand curve. Producer surplus is area $I + L + T$, above the domestic supply curve and below the price line.

(b) With free trade and a world price of P_W, domestic suppliers are unable to charge more than P_W because consumers can purchase all that they want at the world price. At P_W, domestic suppliers are willing to supply quantity Q_1 and demanders will purchase quantity Q_5. The difference between these quantities, $Q_5 - Q_1$, will be imported by Country X.

(c) At the post-tariff price P_T, the domestic supply curve indicates that domestic suppliers will produce the quantity Q_2 rather than Q_1, so the change is $Q_2 - Q_1$. The demand curve indicates that domestic consumers will demand the quantity Q_4 rather than Q_5, so the change is $Q_4 - Q_5$. Consumer surplus shrinks from (H+I+J+K+L+M+N+R+S) to (H+I+J+K), a loss of (L+M+N+R+S). Producer surplus increases from T to T+L, a gain of L.

Question 2 (cont'd)

Grading Rubric:

Question 1: 8 points

a) 3 points:
   1 point - for identifying Q3 and P1
   1 point - for identifying H
   1 point - for identifying I+L+T

b) 1 point - for identifying Q5-Q1

c) 4 points
   1 for identifying Q2-Q1; *Q2 is acceptable if part (b) is correct.*
   1 for identifying Q4-Q5; *Q4 is acceptable if part (b) is correct.*
   1 for identifying the loss: L+M+N+R+S; (*retain H+I+J+K not acceptable—must identify the CHANGE*).
   1 for identifying the gain: L; (*T + L not acceptable—must identify the CHANGE*).

Question 3

Correct Answers:

(a) A profit-maximizing firm will hire workers until the marginal revenue product equals the marginal factor cost.

(b) The marginal revenue product is determined by multiplying the marginal product of workers by the price of pencils ($2). Calculated in this way, the marginal revenue product for the first six workers is $16, $14, $12, $10, $8, and $6. The marginal factor cost for a firm like this one that can hire all the workers that it wants at a fixed wage is equivalent to that wage, which in this case is $8. The profit maximizing condition that marginal revenue product equals the wage rate is met when five workers are hired, making five the profit-maximizing number of workers. Note that the 5th worker costs the firm $8 and contributes $8 worth of output, so the firm is in fact indifferent between hiring four or five workers.

(c) With a wage rate of $6, the firm would do well to hire 6 workers, because it is with 6 workers that the marginal revenue product equals the new wage. Since the 6th worker contributes $6 worth of output and costs $6, it is also possible that the firm will decide to stop hiring after the 5th worker.

(d) With a pencil price of $1, the marginal revenue product for the first six workers is 8, 7, 6, 5, 4, 3, 2, and 1. Marginal revenue product equals wage when three workers are hired, meaning that profits will be maximized with two or three workers (the firm is indifferent between hiring the third or not).

Question 3 (cont'd)

Grading Rubric:

Question 3: 5 points

a) 1 point: Marginal revenue product (MRP) = Marginal factor cost (MFC)
Acceptable answers include: MRP = MFC, MRP =W, MP_L x MR = W, additional
revenue from one more worker = wage, but not MR = W.

b) 2 points:
1 point - 4 or 5 workers
1 point - Hire until MRP = $8 = W

c) 1 point - 5 or 6 workers

d) 1 point: 2 or 3 workers