NAME:

EC 131 - Principles of Microeconomics
Fall 2012

MIDTERM #2

All questions should be answered in the following pages. Nothing here requires a very long answer. Graphs many times help, as does neatness.

You have 75 minutes to complete this exam. Mark **clearly** your answers for the multiple choice questions in their respective letters. If more than one alternative is marked you will not get any point from that question. You can use pencil, though if you do so you won't be able to dispute the grading for that question afterwards. **You MUST return this exam**. Each question clearly states how many points it is worth. The exam is worth 140 points.

The following definitions may be used throughout the exam:

ATC - Average Total Cost
AFC - Average Fixed Cost
AVC - Average Variable Cost
MC - Marginal Cost
MR - Marginal Revenue
Q - Quantity

Marginal Cost (MC) is the derivative of the total cost (TC) with respect to quantity (Q). Example:

$TC = 300 + 5Q + 10Q^2$
then:
$MC = 5 + 20Q$

Marginal Revenue (MR) is the derivative of the total revenue with respect to quantity (Q). Example:

$TR = 100Q - Q^2$
then:
$MR = 100 - 2Q$

Use your time wisely.

Question 1 - (5 points) Consider the production function for Aysun's Pet Sitting Service below and mark the alternative that is **correct** regardless of other details that may not have been provided:

Number of workers	Output (number of pet visits)
0	0
1	20
2	45
3	60
4	70

    a. This production function presents decreasing returns on its input
    b. The marginal product of the third worker is 10 pet visits
    c. The marginal product of the second worker is higher than the marginal product of the first worker
    d. The profit maximizing number of workers is 4

Question 2 - (5 points) Suppose that for a particular firm the only variable input into the production process is labor and that output equals zero when no workers are hired. In addition, suppose that when the firm hires 4 workers, the firm produces 50 units of output. If the fixed cost of production is $4, the cost per unit of labor is $20, and the marginal product of labor for the fifth unit of labor is 2, what is the average total cost of production when the firm hires 5 workers? Mark the **correct** alternative:

    a. $1.61
    b. $1.68
    c. $2.00
    d. $2.08

Consider the graph below for questions 3 and 4, which represents a certain firm's cost structure (Obs: curve A is always decreasing):
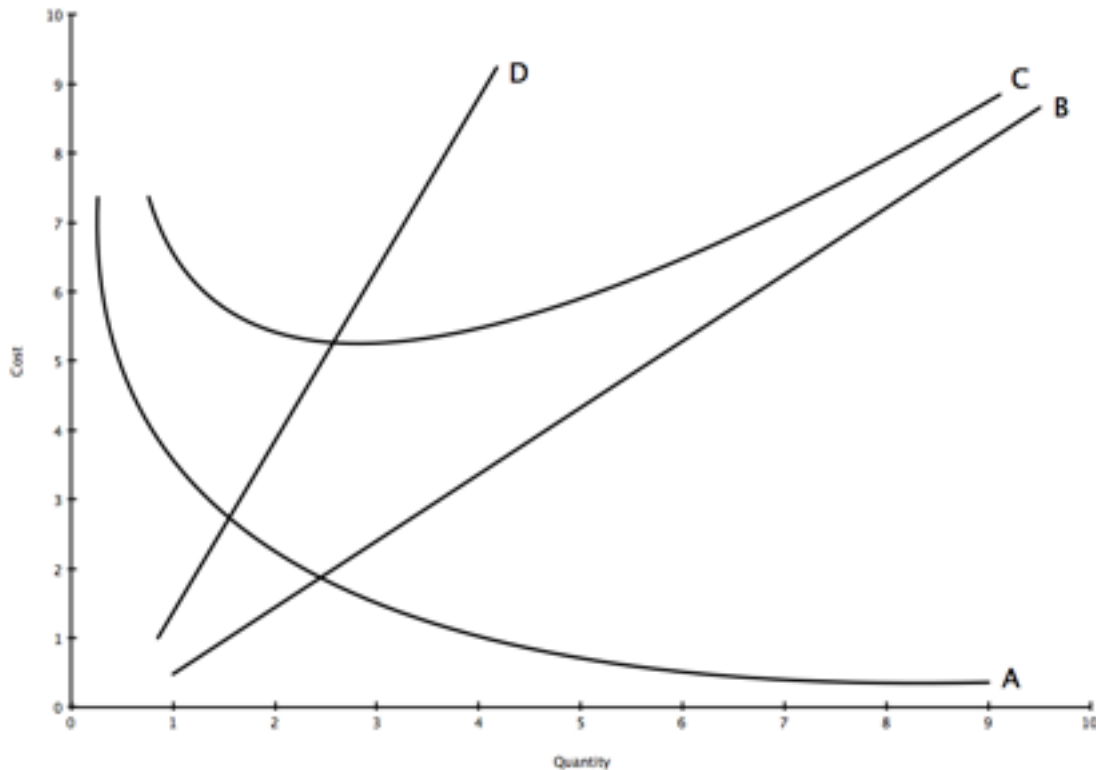
Question 3 - (5 points) Regarding curves shown above, mark the **correct** alternative:

    a. A firm in a perfectly competitive market will decide to shutdown in the short-run if price is below the point where curves **C** and **D** cross each other

    b. A firm in a perfectly competitive market will decide to shutdown in the short-run if price is below the point where curves **A** and **D** cross each other

    c. Curves C and B will never cross each other

    d. None of the above is correct

Question 4 - (5 points) Regarding curves shown above, mark the **correct** alternative:

a. A firm with the cost curves above that enters a perfectly competitive market will produce a quantity between 1 and 2 in the long-run

b. A firm with the cost curves above that enters a perfectly competitive market will produce a quantity between 2 and 3 in the long-run

c. A firm with the cost curves above that enters a monopolistically competitive market will produce a quantity above 3 in the long-run

d. A firm with the cost curves above that is the only firm in that market (being, thus, a monopolist), would never have a negative profit

Question 5 - (5 points) Disney, which has a monopoly in the sales of Mickey Mouse T-Shirts, decides to increase its production from 1 million T-shirts to 1.5 million T-shirts. One month later, the sales report comes back with the surprising result that profits went down from $5 million to $3 million. Assuming that there were no changes in the cost structure or in the demand curve, mark the alternative that is **correct** regardless of other details that may not have been provided:

a. When changing quantity from 1 million to 1.5 million T-shirts, ATC increased

b. Disney wasn't maximizing its profit by producing 1 million T-shirts

c. When Q=1.5 million, ATC>P

d. When Q=1.5 million, MR<MC

Question 6 - (5 points) Senator Hubris wants to pass a law that would require all monopolistically competitive firms to operate at their efficient scale. Assuming that all firms are in their long-run equilibrium, if this law were to pass and be enforced, we would expect that monopolistically competitive firms would, in the short-run:

a. See their profits increase

b. Break even

c. Lose money

d. Not really be affected by the law

Question 7 - (5 points) A profit-maximizing firm with increasing MC is in the US market of corn, which is perfectly competitive. Current price is the long-run equilibrium price. In response to lobby from farmers, the the government decides to raise tariffs on import of corn, which shifts the market supply curve to the left. Mark the **incorrect** item:

a. In the absence of other changes, we expect after some time the number of producers of corn in the US to decrease in response to that policy

b. Soon after that shift in supply, the firm sees that its marginal revenue went above the marginal cost

c. Firms will have a positive profit, in the short-run, in response to that policy

d. Consumer surplus will decrease

*The information in the table below shows the total demand for high-speed Internet subscriptions in a small urban market. Assume that each company that provides these subscriptions incurs an annual **fixed cost of $200,000** (per year) and that the **marginal cost of providing an additional subscription is always $80**. Use that table for questions 8 and 9:*

Quantity	Price (per year)
0	$320
2,000	$280
4,000	$240
6,000	$200
8,000	$160
10,000	$120
12,000	$80
14,000	$40
16,000	$0

Question 8 - (5 points) Suppose that there is only one high-speed Internet service provider in this market and it seeks to maximize its profit. The company will (mark the **correct** item) *Hint: calculating profits from total revenue and total cost is simpler here than thinking in terms of marginal revenue.*:

- a. **Sell 6,000 subscriptions and charge a price of $200 for each subscription**
- b. Sell 8,000 subscriptions and charge a price of $160 for each subscription
- c. Sell 10,000 subscriptions and charge a price of $120 for each subscription
- d. Sell 12,000 subscriptions and charge a price of $80 for each subscription

Question 9 - (5 points) Suppose now that there are two high-speed Internet service provider in this market with the same cost structure above. Mark the **correct** item:

- a. If those firms form a successful cartel, then each one will sell 6,000 subscriptions
- b. If those firms are unable to form a successful cartel, we should expect the price to be between $200 and $240
- c. If those firms are unable to form a successful cartel, then they will not be able to charge a price above marginal cost
- d. **None of the above is correct**

Question 10 - (5 points) Which of the following conditions is characteristic of a perfectly competitive market in both the short-run and the long-run? (Mark the **correct** alternative):

- a. **P=MC**
- b. P>MC
- c. Zero profit
- d. Production at the efficient scale

Consider the game represented by the payoff matrix above to answer questions 12 to 15.

Player 2

		A	B	C
Player 1	**A**	P1 – 4 P2 – 4	**P1 – 3** **P2 – 5 ***	P1 – 1 P2 – 0
	B	P1 – 1 P2 – 5	P1 – 0 P2 – 4	P1 – 2 P2 – 3
	C	**P1 – 5** **P2 – 3 ***	P1 – 2 P2 – 0	P1 – 3 P2 – 2

Question 12 - (2 points) - If Player 1 chooses strategy B, Player 2 may obtain a utility value of at most:

5

Question 13 - (2 points) - If Player 2 chooses strategy C, Player 1's best-response is to play strategy:

C

Question 14 - (2 points) - Does Player 1 have a dominant strategy? If so, which one is it?

No, he doesn't.

Question 15 - (5 points) - Mark with an asterisk (*) the Nash Equilibria of the game (there may be **one**, **more than one** or **none**) in the payoff matrix itself.

Question 16 - (10 points) Suppose that a monopolist faces the demand curve below, has a **fixed cost of $50** and a **variable cost of $1 per unit** produced. Fill the table below with the values of TR (total revenue), FC (fixed cost), VC (variable cost), TC (total cost) and Profit (if profits are negative, indicate with a minus sign. Ex: -$200):

Price	Quantity	TR	FC	VC	TC	Profit
$6	10	60	50	10	60	0
$5	20	100	50	20	70	30
$4	30	120	50	30	80	40
$3	40	120	50	40	90	30
$2	50	100	50	50	100	0
$1	60	60	50	60	110	-50

Question 17 - (25 points) Keroggs is a profit-maximizing firm that produces and sells cereals, a **monopolistically competitive** market. As of November 2012, the firm was making positive economic profits. The firm has positive fixed costs and cereal production presents decreasing returns on its input.
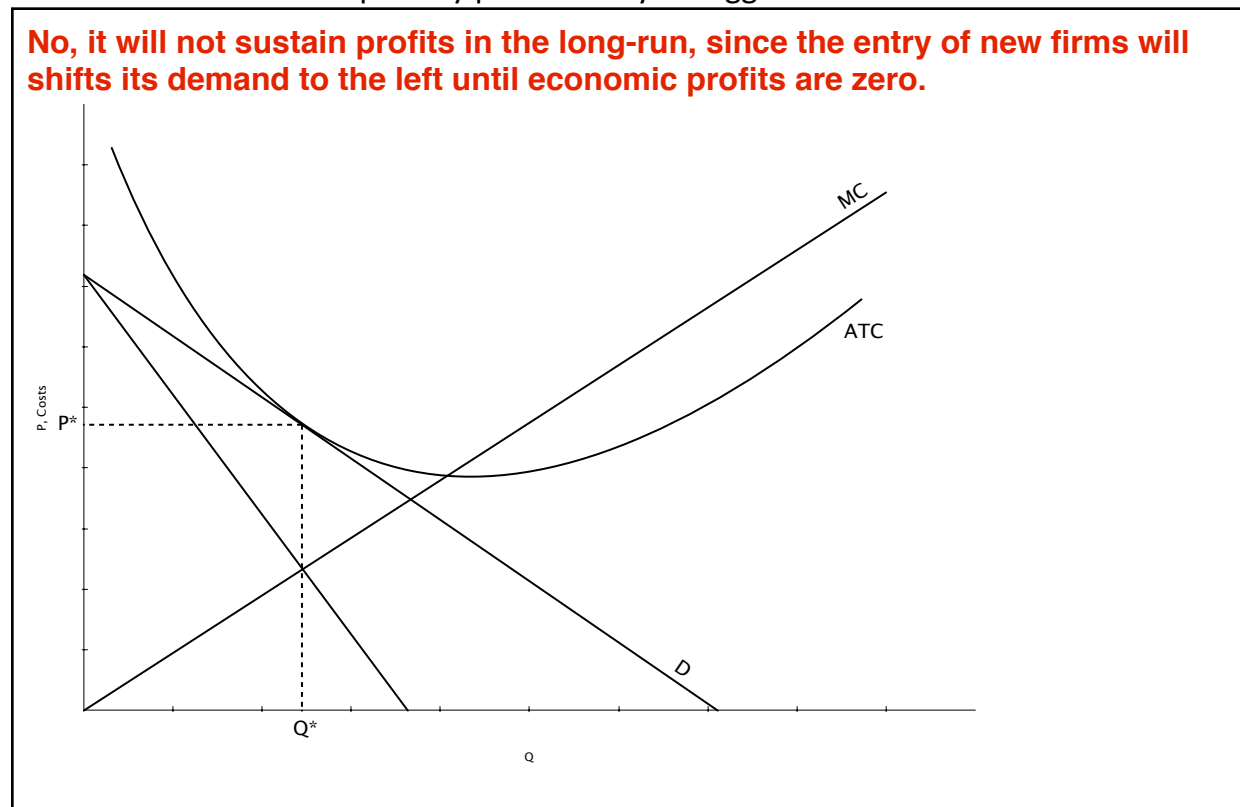
A) Draw below a graph showing a **demand curve,** its **marginal revenue** (MR), the **average total cost** (ATC), the **marginal cost** (MC) and **quantity produced** (Q) in a way that is consistent with Keroggs situation as of November 2012. Show in the graph the area that represents the **profit of that firm**.
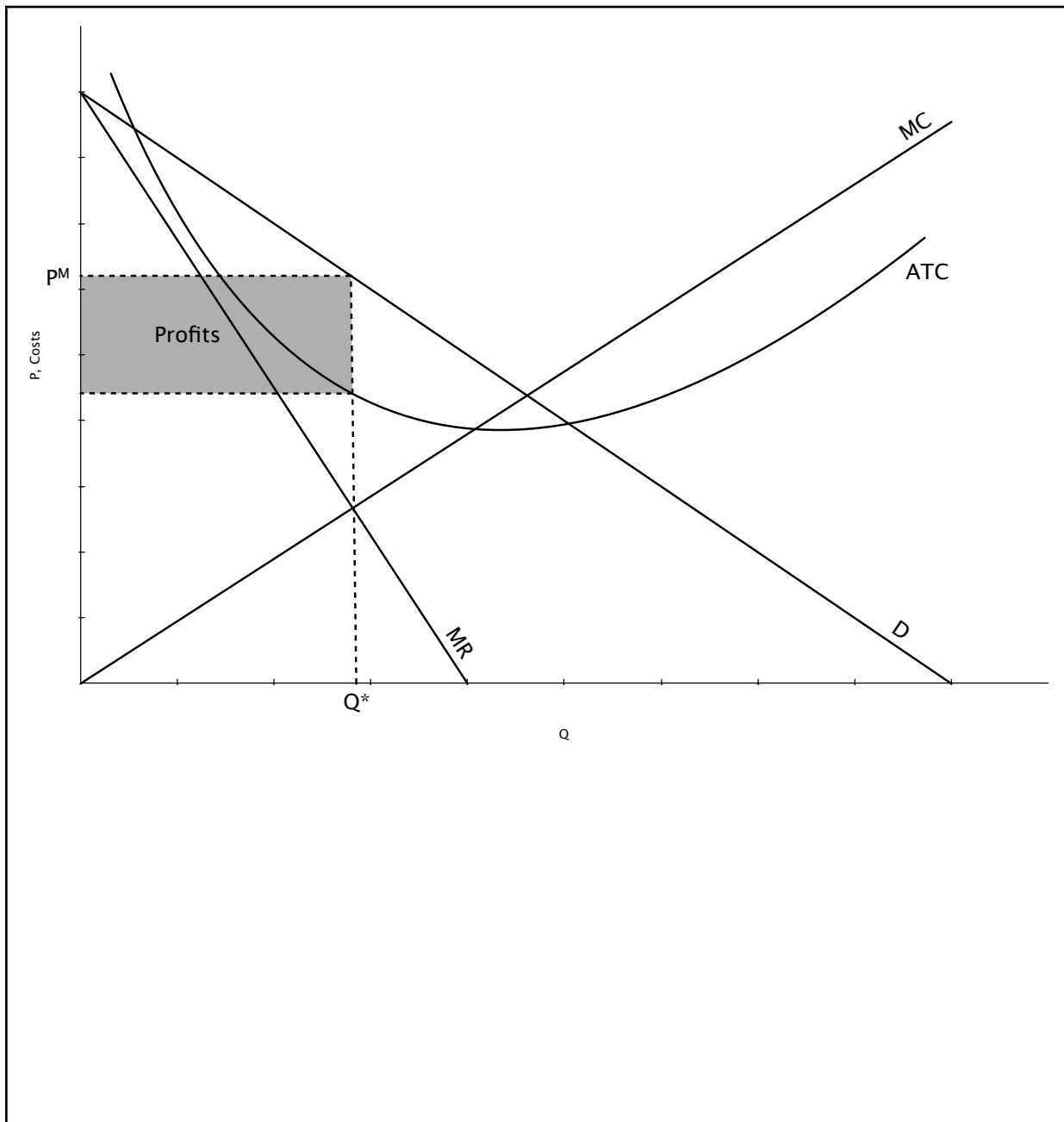
B) Which of those curves will shift as new firms can enter or exit in response to the positive profits? In which way? Show using a simple graph.

Demand will shift to the left.
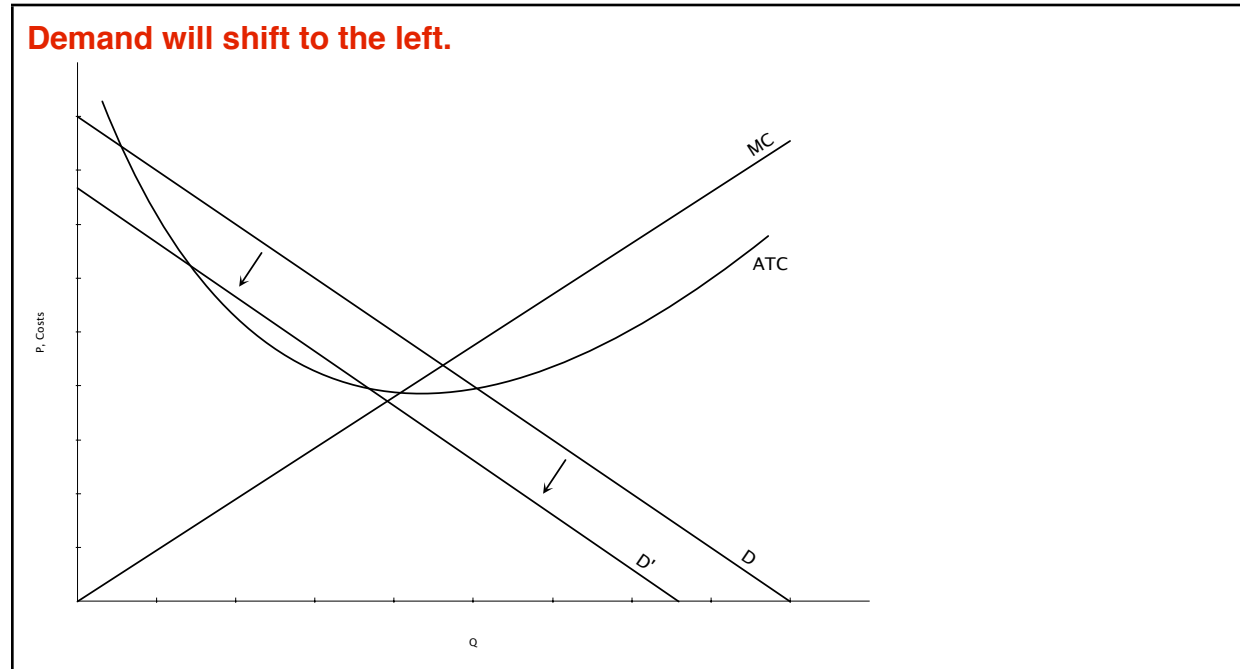
C) Will Keroggs sustain its positive profits in the long-run? Draw the same curves you drew on item A) in its long-run configuration. Be careful and label precisely the curves as well as the quantity produced by Keroggs.

No, it will not sustain profits in the long-run, since the entry of new firms will shifts its demand to the left until economic profits are zero.

Question 18 - (25 points) The demand for electric power in the state of Rhode Island is given by the following inverse demand function:

P=200-2Q

BStar is the only provider of electric power in the state of Rhode Island. Its total cost is given by the following function:

$TC=50Q + Q^2$

A) Derive the expressions for the **average total cost** (ATC), **marginal revenue** (MR) and **marginal cost** (MC). What is the **quantity** (Q) that will be chosen by BStar in order to maximize profit? What will be the **price** (P) that consumers will pay?

ATC=50+Q
MR=200-4Q
MC=50+2Q

P*=150
Q*=25

B) Draw a graph with the **demand** (D), the **marginal revenue** (MR) and the **marginal cost** (MC) curves. Point out the quantity chosen by the monopolist and identify clearly the areas (you don't need to calculate their values) representing the **consumer surplus** (CS), the **producer surplus** (PS) and the **deadweight loss** (DWL) that results from the monopolist's price choice. Mark **clearly** the intercepts of the curves with the vertical and horizontal axes.
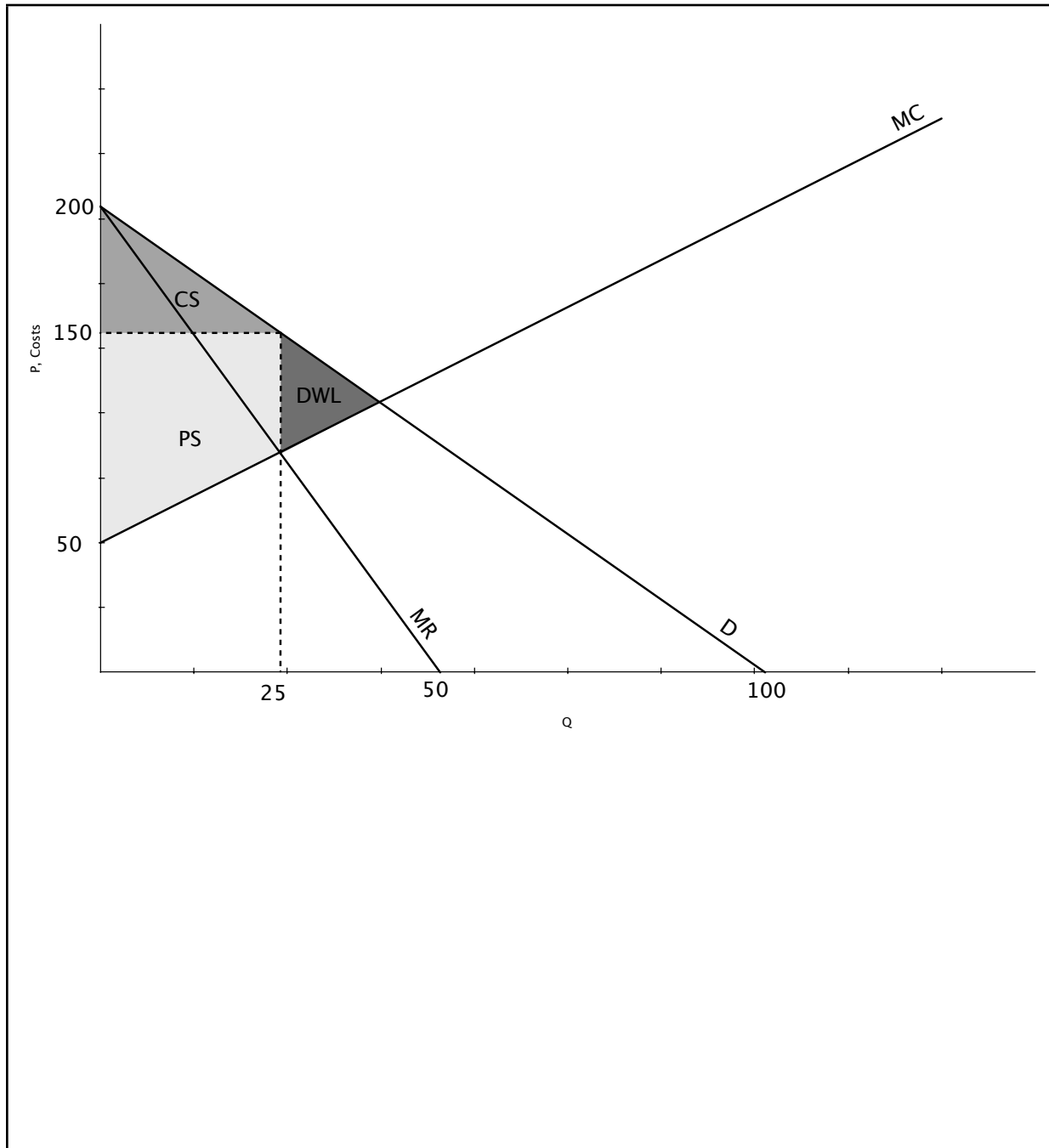
C) Electricity is a regulated market, so that the government can, among other options, set the prices that will be charged by BStar. Suppose that you are the economist responsible for this choice. If your objective is to have an efficient quantity of energy (that is, to maximize **total surplus**), **which price would you set for BStar to charge**? Would this choice be sustainable in the long-run? You may answer this through a precise number, a graph or clear and succinct explanations.

The price that leads to an efficient quantity of energy supplied and consumed is the one that will make the marginal cost of production equal to the value given by the marginal consumer (that is, the consumer that would leave the market as soon as the price is even slightly higher). We can find it by first finding the quantity where the MC curve and the demand curves intersect:

50+2Q=200-2Q
Q=37.5

Thus, the price is:

P=200-2*27.5=$125

The ATC when Q=37.5 is 87.5. Thus, P>ATC, which means that even though profits are not as high as without such regulation, BStar will still enjoy positive economic profits. This is, thus, a sustainable long-run solution.