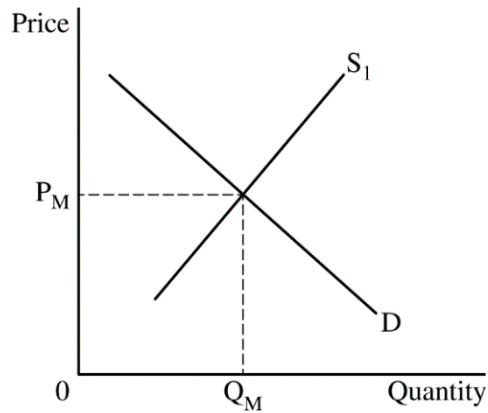
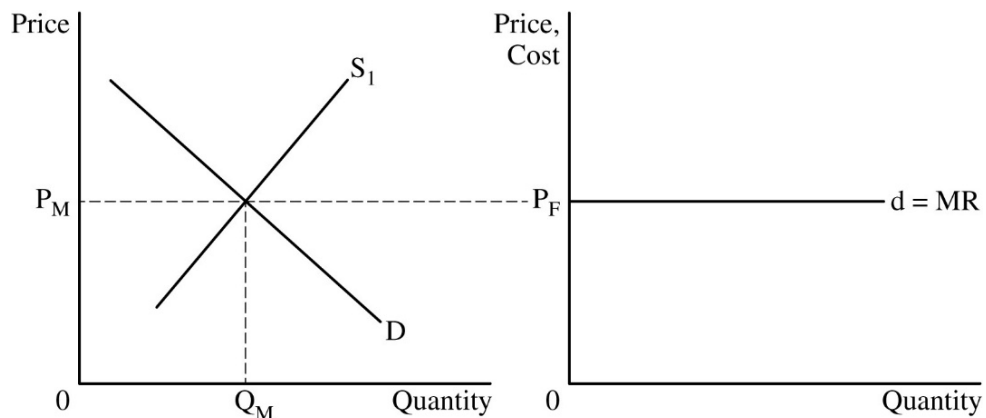


Question 1: Long**10 points**

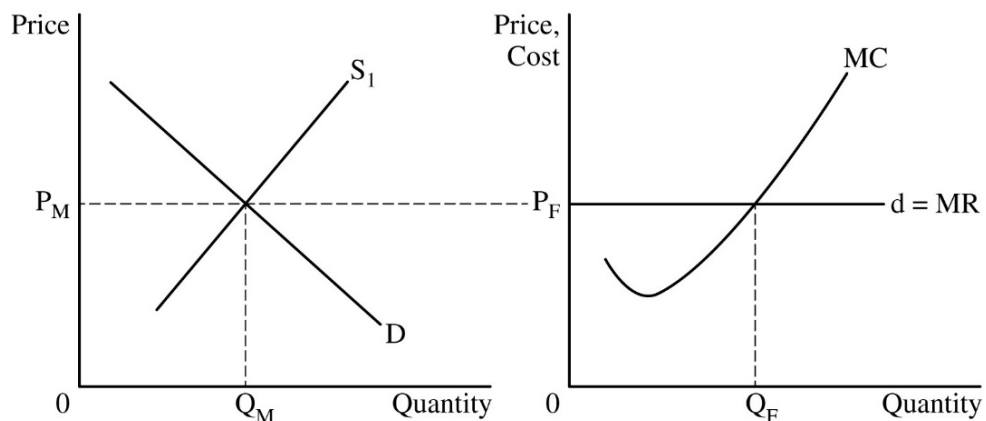
- A** Draw a correctly labeled graph of the market for wooden desks with a downward-sloping demand (D) curve and an upward-sloping supply (S_1) curve and label the market equilibrium price as P_M and the market equilibrium quantity as Q_M . **1 point**
- Point 1



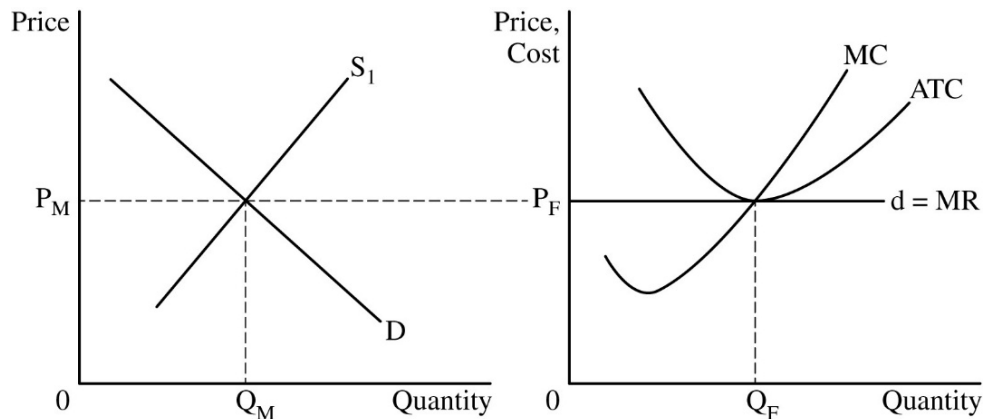
- Point 2 Draw a correctly labeled graph for Deskward that shows the firm's horizontal demand and marginal revenue ($d = MR$) curve extended from the market equilibrium price (P_M) and label the firm's price as P_F . **1 point**



- Point 3 The firm's graph must show a rising marginal cost (MC) curve, and show the firm's profit-maximizing quantity, labeled Q_F , where $MR = MC$. **1 point**

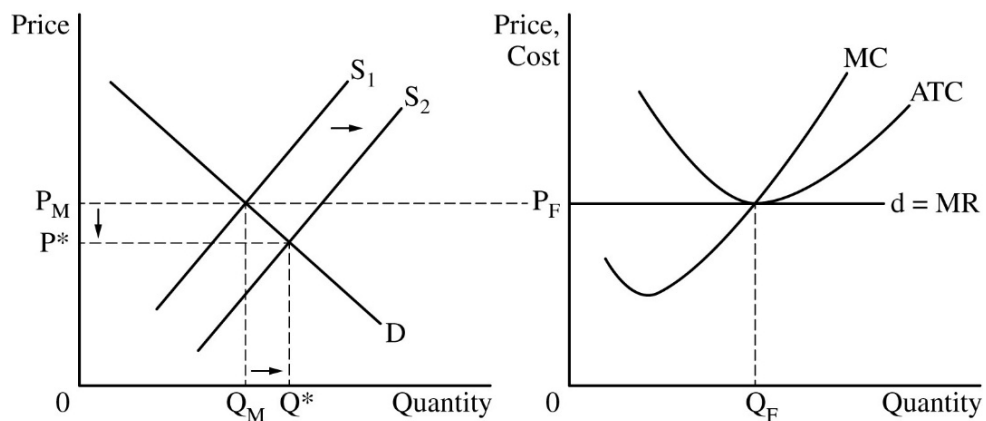


- Point 4 The firm's graph must show the average total cost (ATC) curve tangent to the firm's $d = MR$ curve at Q_F and show the MC curve passing through the minimum point of the ATC curve. **1 point**

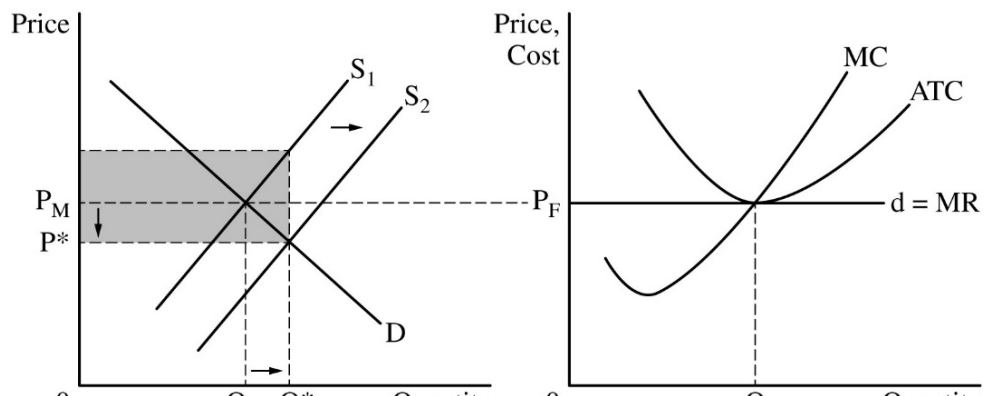


- B** State that Deskward's profit-maximizing quantity will not change in the short run and explain that a change in a fixed cost does not affect the firm's marginal cost or marginal revenue. **1 point**
- Point 5

- C (i)** The market graph from part A must show a rightward shift of the market supply curve and show the new market equilibrium price of wooden desks, labeled P^* , and the new market equilibrium quantity of wooden desks, labeled Q^* . **1 point**
- Point 6



- (ii)** The market graph from part A must show the area representing the total cost of the subsidy to the government, shaded completely. **1 point**
- Point 7



D Point 8	State that the price floor will result in a surplus of wooden desks and explain that the binding price floor is set above the market equilibrium price, which causes the quantity supplied of wooden desks to be greater than the quantity demanded of wooden desks.	1 point
E Point 9	(i) Calculate the long-run average total cost (LRATC) as \$160 per chair and show your work. $\text{LRATC at 500 chairs} = \frac{\$80,000}{500} = \$160$	1 point
E Point 10	(ii) State that Deskward is experiencing diseconomies of scale and explain that as output increases from 500 to 600 chairs, its LRATC increases from \$160 to \$180 (= \$108,000/600) per chair.	1 point

Question 2: Short**5 points**

- (a)**
- Calculate the average fixed cost of \$3 and show the work.

1 point

$$\text{Average Fixed Cost} = \frac{\text{Total Fixed Cost}}{\text{Quantity of Output}}$$

$$\text{Average Fixed Cost} = \frac{\$90}{30} = \$3$$

- (b)**
- Calculate the marginal cost as \$6 and show the work.

1 point

$$\text{Marginal Cost} = \frac{\text{Change in Total Variable Cost}}{\text{Change in Output}}$$

$$\text{Marginal Cost} = \frac{(\$108 - \$90)}{(30 - 27)} = \frac{\$18}{3} = \$6$$

OR

$$\text{Marginal Cost} = \frac{\text{Change in Total Cost}}{\text{Change in Output}}$$

$$\text{Marginal Cost} = \frac{(\$198 - \$180)}{(30 - 27)} = \frac{\$18}{3} = \$6$$

- (c)**
- State that diminishing marginal returns to labor begin with the hiring of the 3
- rd
- worker and explain that the marginal product of the 1
- st
- worker is 5 bags, the marginal product of the 2
- nd
- worker increases to 7 bags, and the marginal product of the 3
- rd
- worker decreases to 6 bags.

1 point

- (d)**
- State that the profit-maximizing number of workers is 7 and explain that the marginal revenue product (MRP) of the 7
- th
- worker (\$20) is greater than the marginal factor cost (MFC) of the 7
- th
- worker (wage = \$18), and that the hiring of the 8
- th
- worker would decrease profits because the MRP of the 8
- th
- worker (\$10) is less than the MFC of the 8
- th
- worker (wage = \$18).

1 point

- (e)**
- State that Gato Food will experience diseconomies of scale and explain that as output increases from 40 to 50 units, long-run average total cost increases from \$15 to \$18 per unit.

1 point**Total for question 2 5 points**

Question 3: Short**5 points**

(a) State that the firm is experiencing economies of scale and explain that the long-run average total cost (LRATC) curve is downward sloping over the range of 0 to 60 units. **1 point**

(b) State that the price is \$15 and the quantity is 50 units. **1 point**

(c) (i) Calculate the total revenue at the socially optimal quantity as \$600 and show your work. **1 point**

$$\text{Total Revenue} = \text{Price} \times \text{Quantity} = \$10 \times 60 = \$600$$

(ii) Explain that at the socially optimal quantity, the firm is earning negative economic profit in the short run because price is less than average total cost. **1 point**

(iii) Calculate the lump-sum subsidy as \$180 and show your work. **1 point**

$$\text{Lump-sum Subsidy} = (\text{LRATC} - \text{Price}) \times \text{Quantity} = (\$13 - \$10) \times 60 = \$180$$

Total for part (c) 3 points

Total for question 3 5 points

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2016 SCORING GUIDELINES

Question 1

10 points (3+3+4)

(a) 3 points:

- One point is earned for stating that the quantity supplied exceeds the quantity demanded at the price floor or the price floor would result in a surplus because the price floor is binding or effective.
- One point is earned for correctly calculating the price elasticity of supply.
Students can use either the midpoint formula or the point elasticity formula.

$$E = (500/1250) / (0.2/1.1) = 2.2$$

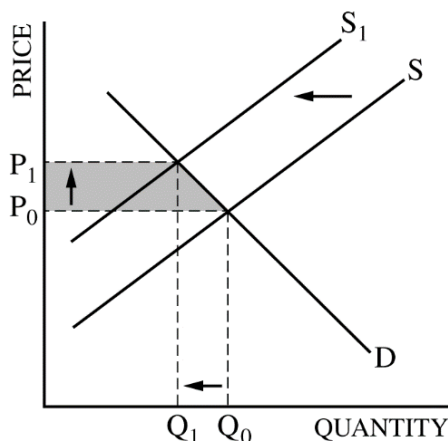
$$E = (50\%/20\%) = 2.5$$

$$E = (500/0.2) \times (1/1000) = 2.5$$

$$E = [(1500-1000)/1000] / [(1.2-1)/1] = 0.5/0.2 = 2.5$$

$$E = (500/0.2) \times (1.2/1500) = 2$$
- One point is earned for stating that the supply is elastic and for explaining that the percentage change in quantity supplied exceeds the percentage change in price or because price elasticity of supply is greater than one. (Other equivalent explanations are accepted.)

(b) 3 points:



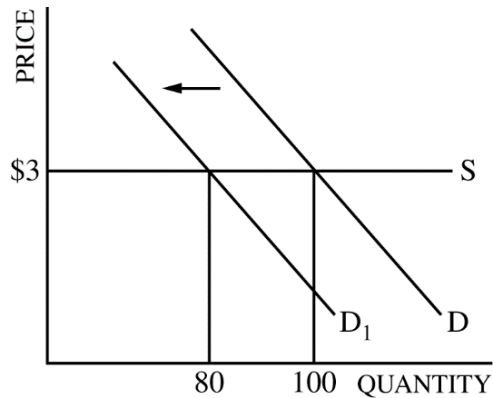
- One point is earned for drawing a correctly labeled graph and for showing the equilibrium price and quantity, labeled P_0 and Q_0 , respectively.
- One point is earned for shifting the supply curve to the left and for showing the new equilibrium price and quantity, labeled P_1 and Q_1 , respectively.
- One point is earned for completely shading on the graph the area representing the change in consumer surplus.

2016 SCORING GUIDELINES

Question 1 (continued)

(c) 4 points:

- One point is earned for stating that coffee and muffins are complementary goods.



- One point is earned for drawing a correctly labeled graph for the coffee market and showing a horizontal supply curve (S) and a downward sloping demand curve (D).
- One point is earned for shifting the demand curve to the left and for showing a decrease in the equilibrium quantity and no change in the equilibrium price of coffee.
- One point is earned for correctly calculating the new equilibrium quantity and showing the work.

$$\% \Delta Q = (10\% \times -2) = -20\%$$

$$\text{New Equilibrium Quantity} = 100 \times (-20\%) = 80$$

OR

$$\text{New Equilibrium Quantity} = 100 - (0.2 \times 100) = 80$$

(Using the midpoint formula is also acceptable.)

2016 SCORING GUIDELINES

Question 2

7 points (1+1+1+1+3)

(a) 1 point:

- One point is earned for stating that the marginal benefit is \$1.

(b) 1 point:

- One point is earned for correctly calculating the total consumer surplus from consuming 5 units of X.

$$CS = (\$16 - \$4) + (\$12 - \$4) + (\$8 - \$4) + (\$4 - \$4) + (\$1 - \$4) = \$21$$

OR

$$CS = \$41 - \$20 = \$21$$

(c) 1 point:

- One point is earned for explaining that this combination of X and Y is not optimal because the marginal benefit per dollar of good X ($MB_x/P_x = \$4/\$4 = 1$) is less than the marginal benefit per dollar of good Y ($MB_y/P_y = \$8/\$2 = 4$). (This can also be stated as $MB_x/MB_y < P_x/P_y$.)

$(MB_x/P_x = 1)$ is not equal to $(MB_y/P_y = 4)$ is acceptable.

MB_x/P_x is less than MB_y/P_y is acceptable.

MB_y/P_y is greater than MB_x/P_x is acceptable.

(d) 1 point:

- One point is earned for stating that Martha's optimal combination is 3 units of X and 4 units of Y.

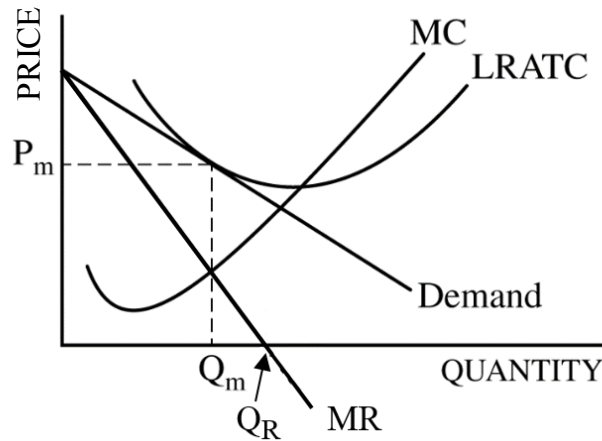
(e) 3 points:

- One point is earned for stating that the optimal quantity of good Y will decrease.
- One point is earned for stating that the optimal quantity of good Y will decrease.
- One point is earned for stating that the optimal quantity of good Y will stay the same.

2016 SCORING GUIDELINES

Question 3

6 points (4+1+1)



(a) 4 points:

- One point is earned for drawing a correctly labeled graph showing a downward sloping demand curve with MR curve below the demand curve.
- One point is earned for showing the quantity, Q_m , at $MC=MR$
- One point is earned for showing the price, P_m , on the demand curve above Q_m
- One point is earned for showing the long-run average total cost tangent to the demand curve at Q_m .

(b) 1 point:

- One point is earned for showing Q_R at $MR=0$.

(c) 1 point:

- One point is earned for stating that firms in this market are experiencing economies of scale in long-run equilibrium because LRATC is decreasing OR because Q_m is to the left of the minimum point of the LRATC.

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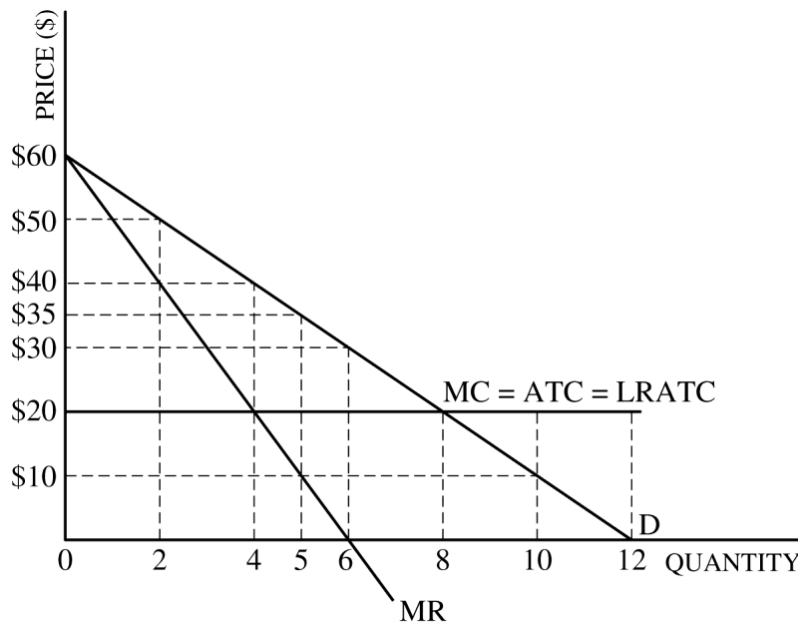
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2014 SCORING GUIDELINES

Question 1

10 points (3 + 1 + 3 + 1 + 2)



3 points:

- One point is earned for identifying the profit-maximizing quantity, $Q = 4$.
- One point is earned for identifying the profit-maximizing price, $P = \$40$.
- One point is earned for identifying the allocatively efficient output, $Q = 8$.

1 point:

- One point is earned for stating that the firm is not experiencing economies of scale and for explaining that the LRATC is not downward sloping as output increases or LRATC remains constant as output increases.

3 points:

- One point is earned for correctly showing the calculation for the monopolist's economic profit.

$$\pi = (P - ATC) \times Q = (\$10 - \$20) \times 10 = -\$100$$

Or loss of \$100

Other correct calculations are acceptable.

- One point is earned for correctly showing the calculation of consumer surplus.

$$CS = 1/2 (\$60 - \$10) \times 10 = \$250$$

Other correct calculations are acceptable.

- One point is earned for correctly showing the calculation of the deadweight loss.

$$DWL = 1/2 (\$20 - \$10) \times (10 - 8) = \$10$$

Other correct calculations are acceptable.

2014 SCORING GUIDELINES

Question 1 continued

1 point:

- One point is earned for identifying the quantity at which demand is unit elastic, 6.

2 points:

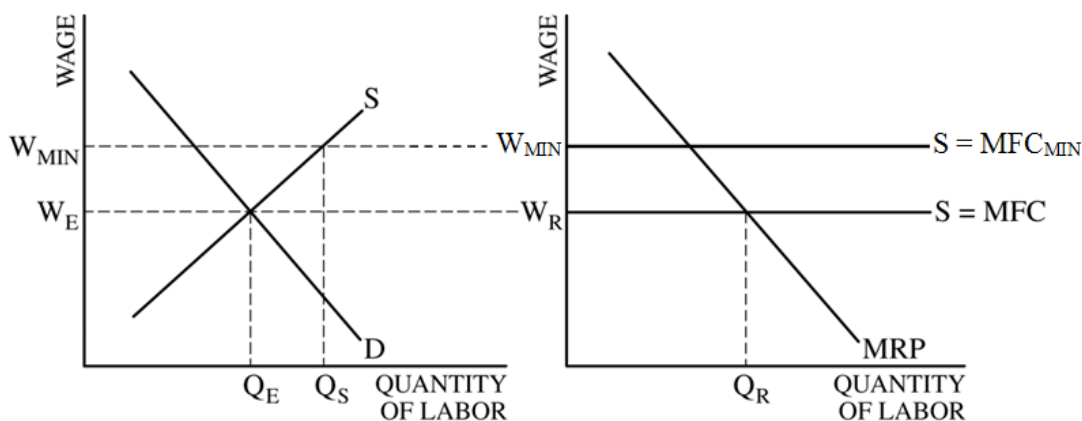
- One point is earned for correctly determining the monopolist's profit.

$$1/2[(\$60 - \$20) \times 8] = \$160$$
- One point is earned for correctly determining the consumer surplus as zero.

2014 SCORING GUIDELINES

Question 2

6 points (2 + 1 + 3)



2 points:

- One point is earned for drawing a correctly labeled graph of the labor market with an upward-sloping labor supply curve and a downward-sloping labor demand curve and for correctly identifying the equilibrium wage, W_E , and quantity, Q_E .
- One point is earned for drawing a correctly labeled graph showing Ray's Stable demand curve for labor and a horizontal labor supply curve and showing the equilibrium wage, W and quantity, Q_R .

1 point:

- One point is earned for stating that Ray's Stable's marginal factor cost is equal to W and for explaining that the firm is a wage taker in the labor market and/or the market sets the wage.

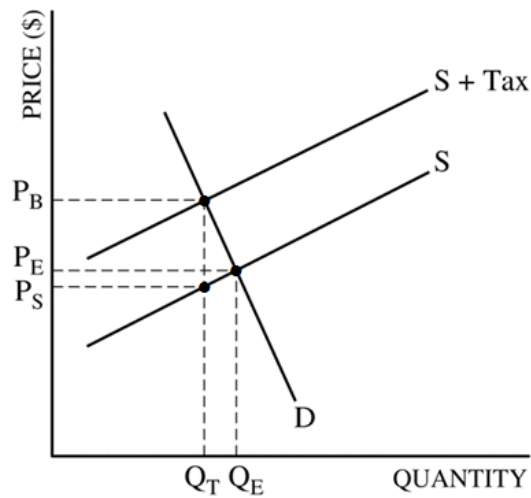
3 points:

- One point is earned for showing the minimum wage, W_{MIN} , on the graph in part (a) above the equilibrium wage W_E .
- One point is earned for showing the quantity supplied of unskilled labor, Q_S , derived from the supply curve at W_{MIN} .
- One point is earned for stating that the marginal revenue product of the last worker hired will increase.

2014 SCORING GUIDELINES

Question 3

6 points (1 + 3 + 1 + 1)



1 point:

- One point is earned for drawing a correctly labeled graph of the gasoline market showing the equilibrium price, P_E , and quantity, Q_E .

3 points:

- One point is earned for showing P_B above P_E , derived from the D curve at Q_T .
- One point is earned for showing P_S below P_E , derived from the S curve at Q_T .
- One point is earned for showing Q_T less than Q_E .

Note: It is not necessary to draw the $S + \text{Tax}$ curve; a “tax wedge” approach is acceptable.

1 point:

- One point is earned for correctly calculating the total tax revenue based on the labeling of the graph.

All of the following are acceptable when P_B and P_S are correct:

- $(P_B \times Q_T) - (P_S \times Q_T)$
- $(P_B - P_S) \times Q_T$
- $2 \times Q_T$
- $\text{Tax} \times Q_T$

1 point:

- One point is earned for explaining that the tax burden will fall more on buyers and less on sellers because the demand curve is more inelastic than the supply curve.