

5) You know that the inverse demand curve is defined by the following function: $p=100-5q$.

a. Use the bisection rule to define the marginal revenue curve

$$P = 100 - 5q$$

$$MR = 100 - 2 \cdot 5q = 100 - 10q$$

b. If total cost is defined by $10 \cdot q$, then you know MC is 10 for all possible levels of q . What is the value of Average Cost? Explain.

$$AC = \frac{TC}{q} = \frac{10q}{q} = 10$$

c. At what q do marginal cost and marginal revenue cross?

$$100 - 10q = 10$$

$$90 = 10q$$

$$q = 9$$

d. What is the selling price for a monopolist?

$$100 - 5(9) = 100 - 45 = 55$$

e. Why is the firm not better off setting $q=0$ and shutting down rather than producing at the q you noted in (c)? Explain your reasoning briefly

$$\begin{aligned} \pi(q=9) &= p \cdot q - TC(q) \\ &= 55 \cdot 9 - 10 \cdot 9 \\ &= 495 - 90 = 405 \end{aligned}$$

$$\pi(q=0) = 0$$

$$405 > 0$$

6) Continue with the inverse demand curve $p=100-5q$ and the $MC=10$ supply curve from problem (5). Assume the market for this commodity has become a perfectly competitive market.

a. What are the market price and quantity in the market if all firms in the competitive market have identical cost structures to the monopoly firm ($MC=10$ for all units of q produced) and the inverse demand curve is $p=100-5q$?

$$100 - 5q = 10$$

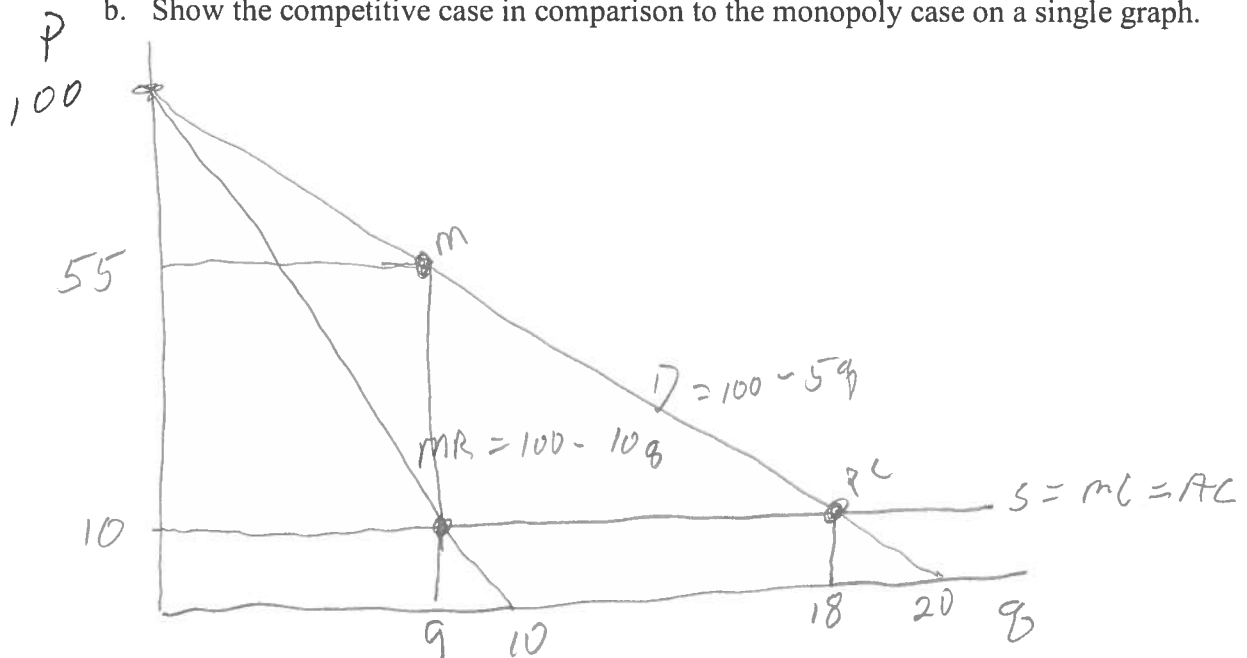
$$90 = 5q$$

$$q = 18$$

$$100 - 5(18) = 100 - 90$$

$$100 - 90 = 10$$

b. Show the competitive case in comparison to the monopoly case on a single graph.



c. Calculate the values for the following table.

	Monopoly	Perfect Competition
Consumer Surplus	$\frac{1}{2}(100 - 55) \cdot 9$ $= 202,5$	$\frac{1}{2}(100 - 10) \cdot 18$ $= 810$
Producer Surplus	$(55 - 10) \cdot 9$ $= 405$	0
Deadweight Loss	$\frac{1}{2}(55 - 10) \cdot (18 - 9)$ $= 202,5$	0
Total Social Welfare	607,5	810

$$(810 - 607,5 = 202,5)$$