Prob. Ch.11 Monopoly

The demand and cost functions for Wayless (monopolist), a dietary supplement, are as follows

$$Q = 50 - 0.5P; \qquad C(Q) = 100 + 8Q^2$$

i. Calculate profit maximizing price, quantity and profit.
ii. Find the elasticity of demand at the profit maximizing level of output.
iii. Calculate the deadweight loss due to monopoly.

(i) Find Q by setting MC = MR

$Q = 50 - .5P$

$.5P = 50 - Q$

$\therefore P = 100 - 2Q$

$MR = 100 - 4Q$

$C = 100 + 8Q^2$

$MC = \frac{dC}{dQ} = 16Q$

$\therefore 16Q = 100 - 4Q$

$20Q = 100$

$Q = 5$ units

$P = 100 - 2(5) = \$90$

$\Pi = 90(5) - [100 + 8(5)^2]$

$= 450 - 300$

$= \$150$

(ii) $\epsilon = \frac{dQ}{dP} \cdot \frac{P}{Q} = -.5 \frac{[90]}{5} = -9$

(iii) Under Competition

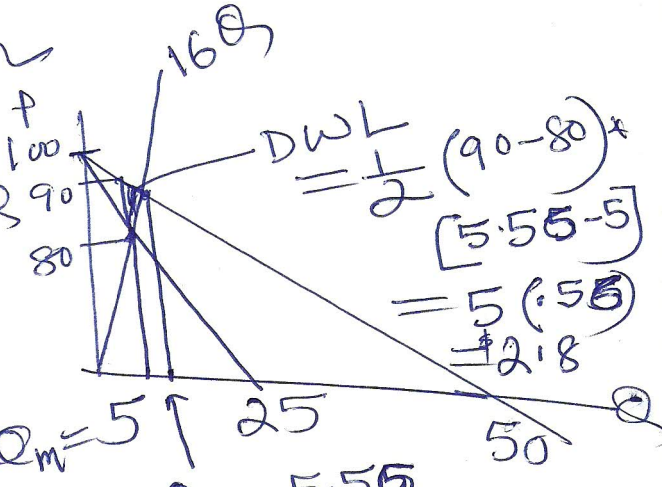
$MC = P$

$16Q = 100 - 2Q$

$\therefore 18Q = 100$

$Q = 5.555$

$= 5.56$



Loss in output = .56

DWL = Area of the triangle = 2.8