

Finance 30210
Quiz #9

Name _____

Section _____

1) Suppose that the market demand is described by

$$P = 600 - (Q + q)$$

Where Q is the output of the incumbent firm, q is the output of the potential entrant and P is the market price. The incumbent's cost function is given by

$$TC(Q) = 20Q$$

While the cost function of the entrant is given by

$$TC(q) = 20q + 400 \text{ (400 is a fixed cost paid upon entering the market)}$$

By virtue of already operating in the marketplace, the incumbent firm gets to select its production level first. The entrant observes this before making its production decision.

- a) Suppose that the incumbent is simply profit maximizing. How much would the incumbent produce and what would the market price be?
- b) How much would the incumbent have to produce to keep the entrant out of the market? At what price will the incumbent sell this output?

First, we need the incumbent's strategy

$$q = 290 - .5Q$$

Now, plug this into the demand curve:

$$P = 600 - (Q + q)$$

$$P = 600 - (290 - .5Q) - Q$$

$$P = 310 - .5Q$$

Now, profit maximize:

$$P = 310 - .5Q$$

$$TR = 310Q - .5Q^2$$

$$MR = 310 - Q = 20 = MC$$

$$Q = 290$$

$$q = 290 - .5(290) = 145$$

$$P = 165$$

Here, we want to choose production to bring the entrant's profits down to zero:

$$\pi = (P - MC)q - 400 = 0$$

$$(600 - q - Q)q = 400$$

$$(600 - (290 - .5Q) - Q - 20)(290 - .5Q) = 400$$

$$(290 - .5Q)(290 - .5Q) = 400$$

$$290 - .5Q = 20$$

$$Q = 540$$

$$q = 20$$

$$P = 40$$