

Finance 30210
Quiz #6

Name _____

- 1) Suppose that you are a monopoly faced with a demand curve given by

$$Q = 120 - 4P$$

You have a constant marginal cost equal to \$20.

- a) Calculate your optimal price and quantity.

First, calculate inverse demand by solving for price.

$$P = 30 - .25Q$$

Now, multiply by quantity to get total revenues:

$$TR = PQ = 30Q - .25Q^2$$

Take the derivative to get marginal revenues:

$$MR = 30 - .5Q$$

Set marginal revenue equal to marginal cost and solve for quantity:

$$30 - .5Q = 20$$

$$Q = 20$$

$$P = 30 - .25(20) = 25$$

- b) Calculate the elasticity of demand at your profit maximizing price/quantity.

$$\varepsilon = \left(\frac{\Delta Q}{\Delta P} \right) \left(\frac{P}{Q} \right) = -4 \left(\frac{25}{20} \right) = -5$$

- c) Calculate your profit and consumer surplus.

$$\pi = (P - MC)Q = (25 - 20)20 = 100$$

$$CS = \left(\frac{1}{2} \right) (P_0 - P)Q = \left(\frac{1}{2} \right) (30 - 25)20 = 50$$

- d) How would your answers to (a) – (c) change if this industry was perfectly competitive?

Perfectly competitive firms always set a price equal to marginal cost.

$$P = MC = \$20$$

$$Q = 120 - 4P = 120 - 4(20) = 40$$

$$\pi = (P - MC)Q = 0$$

$$CS = \left(\frac{1}{2}\right)(P_0 - P)Q = \left(\frac{1}{2}\right)(30 - 20)40 = 200$$

Lastly, perfectly competitive firms always locate on a much less elastic portion of the demand curve.

$$\varepsilon = \left(\frac{\Delta Q}{\Delta P}\right)\left(\frac{P}{Q}\right) = -4\left(\frac{20}{40}\right) = -2$$