ECO 135 Ch. 5 Elasticity HW Answers

4. Note: Answer a by using % changes, not midpoint formula. (not covered in the class)

a. $PEd_{(A\to B)} = \frac{\left(\frac{100-50}{50}\right)*100\%}{\left(\frac{75-90}{90}\right)*100\%} = \frac{100\%}{-16.67\%} = -5.99$ (elastic)

$PEd_{(C\to D)} = \frac{\left(\frac{200-150}{150}\right)*100\%}{\left(\frac{45-60}{60}\right)*100\%} = \frac{33.3\%}{-25\%} = -1.332$ (elastic)

$PEd_{(E\to F)} = \frac{\left(\frac{300-250}{250}\right)*100\%}{\left(\frac{15-30}{30}\right)*100\%} = \frac{20\%}{-50\%} = -0.4$ (inelastic)

b. (Case 1)
$P_0 = 75 \to P_1 = 90$
$\Rightarrow Q_0 = 100 \to Q_1 = 50$
$\Rightarrow TR_0 = 7500 \to TR_1 = 4500$
Total Revenue decreased.

(Case 2)
$P_0 = 45, P_1 = 60$
$Q_0 = 200 \to Q_1 = 150$
$TR_0 = 9000 \to TR_1 = 9000$
Total Revenue doesn't change.

(Case 3)
$P_0 = 15 \to P_1 = 30$
$Q_0 = 300 \to Q_1 = 250$
$TR_0 = 4500 \to TR_1 = 7500$.
Total Revenue increased

[case 1] Demand is very elastic
→ a small change in price will lead to large reduction in Q.D.
→ TR decreases.

[case 2] Demand is inelastic:
→ a change in price will not lead to large reduction in Q.D.
→ TR. increases

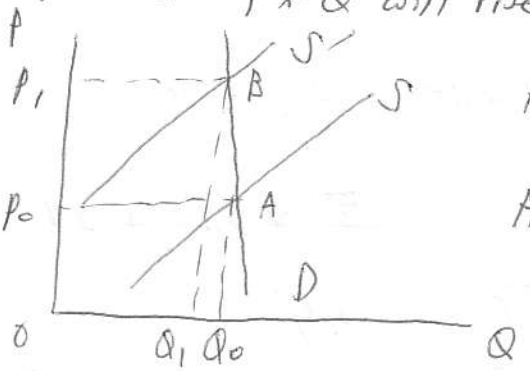
c) When demand is elastic, a price increase will lead to a revenue decline.
When demand is inelastic, a revenue increase.

Q5 a. $PEd = -0.2$.

Disagree. Buyers will spend more.

Since the demand is inelastic, the % decline in quantity demanded is less (in absolute value) than the % increase in price.

→ Total expenditure $P * Q$ will rise.



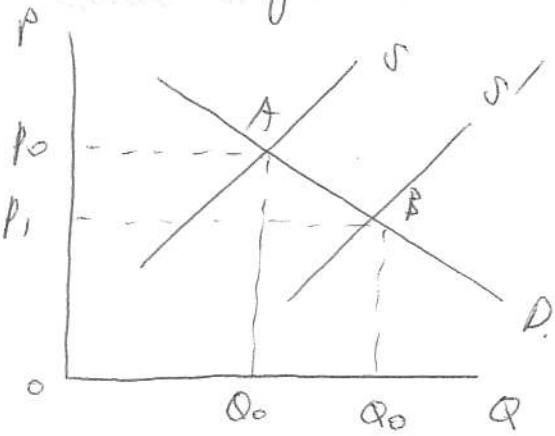
Area OP_0AQ_0 (Total expenditure) is smaller than Area OP_1BQ_0 (total expenditure)

b. P ↓ 10%.

$PEd = -1.3$

Disagree. Since demand is elastic, the % increase in quantity of trees demanded will be greater than the % decrease in price.

→ Total Revenue collected by vendors will rise.



Area P_0AQ_0D is greater than Area $0P_1BQ_0$.

c. Disagree. If demand has unitary elasticity, then the % change in quantity & the % change in price are exactly equal. Thus, total Revenue (PQ) will not change.

⇐ Note: this is true if we use <u>mid-point formula</u>

Slightly different result for % change formula.

8. $PEd = -0.20$.

Q. Supply ↓ by 10%

a. $$PEd = \frac{-10\%}{\frac{(P_1 - 2.60)}{2.60} * 100\%} = -0.20. \rightarrow \text{solve for } P_1$$

$$-0.20\left(\frac{P_1 - 2.60}{2.60} * 100\%\right) = -10.$$

$$\frac{P_1 - 2.60}{2.60} * 100\% = \frac{10}{0.20} = 50$$

$$P_1 = \frac{50}{100} * 2.60 + 2.60$$

$$\boxed{P_1 = 3.9}$$

Price will increase by $3.9 - 2.6 = \#1.3$.

b. price ceiling at $P = \#2.60$ will create excess demand or shortage of gasoline. The result might be long lines at gas station & black market in gasoline.