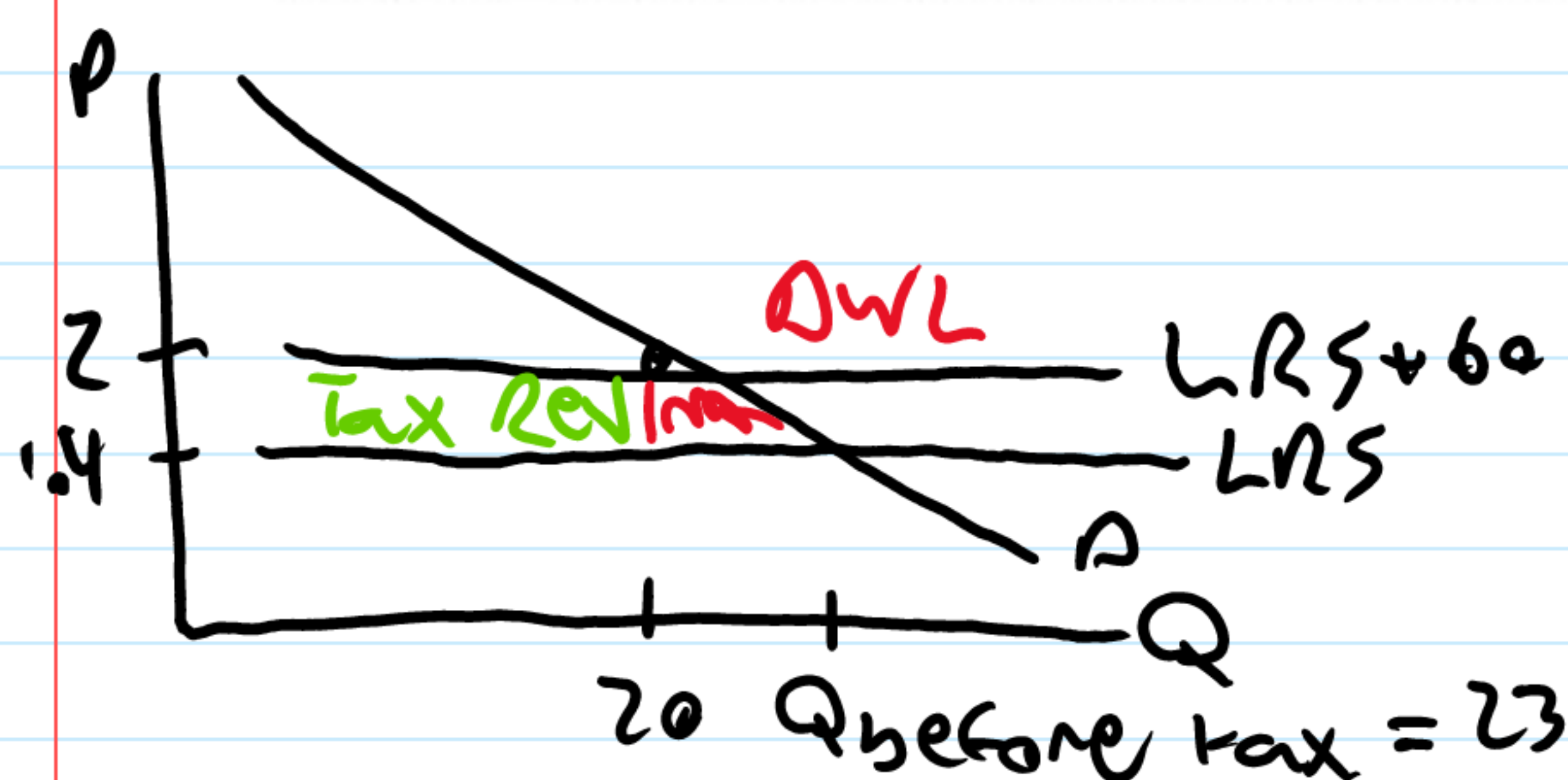Floridians use about 20 million gallons of automotive gasoline per day. Including federal and state taxes, the tax rate is about $0.60 per gallon. The elasticity of demand for gasoline is approximately -0.5.

1) Illustrate the current equilibrium.
2) Calculate the quantity consumed daily if the price was lower by the amount of the gas tax. Add it to your illustration.
3) How much tax revenue is raised? Label it in your illustration.
4) Calculate the loss of consumer surplus due to the gas tax. Label it in your illustration.
5) How much consumer surplus was lost per unit of revenue raised by the tax?

Assume that the current gas tax is $0.50 per gallon too low to cover the cost of maintaining roadways in a safe condition for driving. If the tax were high enough to cover this cost…
6) What would consumption be? Add it to your illustration.
7) What would tax revenue be?
8) Calculate the loss of consumer surplus going from the original tax to the new tax. Show it in your illustration.
9) Going from the initial tax to the new tax, how much consumer surplus was lost per unit of additional tax revenue raised?
10) Compare your answer in (8) to your answer in (5). Can you explain the difference? What would happen to this ratio if the tax went from $1.1 to $1.15? Don't calculate anything. Just think it through and explain what would change and why.

11) Suppose elasticity of demand reasonably might be as high as 0.7 or as low as 0.3. How sensitive is your estimate of the consumer surplus loss form #4 to these possible differences?



$$\xi^D = \frac{\%\Delta Q^D}{\%\Delta P}$$

$$\xi^D = \frac{\partial Q}{\partial P} \cdot \frac{P}{Q} = \frac{\Delta Q}{-.6} \cdot \frac{.6}{20} \rightarrow -.5 = \frac{\Delta Q}{-.6} \rightarrow$$

$$\Delta Q = 3 \rightarrow Q_{at} = 23$$

$Q_{before\ tax} = 23$   20

$QWL = \frac{1}{2} \cdot .6 \cdot 3 = 0.9$

Tax Rev = 12

6) $\frac{\%\Delta Q}{25\%} = -\frac{1}{2}$     $\%\Delta Q = 12.5\%$

7) $\Delta CS = -.5 \cdot 17.5 - \frac{1}{2} \cdot .5 \cdot 2.5 = 9.375$

$DCS/GTR = -9.375 / 7.5 = -1.25$

11) $\xi^d = -.7, -.3$