Problem set 5, due Monday 3/30/2015

1. Negative externality. Suppose the market for a certain good (e.g. 'gasoline') is perfectly competitive, but that the good causes a *negative* externality. Marginal benefit, marginal private cost, and marginal external cost are given by the functions below:

$$MB = 20 - \frac{1}{50}q$$
 $MC = 5 + \frac{1}{100}q$ $MEC = 6$

a) No policy. Given that there is no policy to address the externality, find the equilibrium quantity, price, consumer surplus, producer surplus, external cost, and total economic surplus.

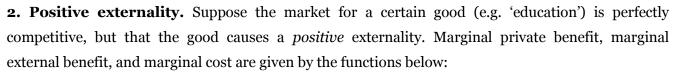
$$q =$$
_____ $p =$ ____ $CS =$ ____ $TES =$ ____

Graph the market with no policy intervention, labeling CS, PS, and deadweight loss (DWL). Why is this area the deadweight loss?

b) Pigovian tax. To maximize total economic surplus, the government should charge a tax of $\tau^o =$ ______ per unit to the consumers. Given this, find the equilibrium quantity, price, consumer surplus, producer surplus, external cost, government revenue, and total economic surplus.

$$q =$$
______ $p =$ _____ $CS =$ _____
 $PS =$ _____ $EC =$ _____ $GR =$ _____ $TES =$ ______

Graph the market with the subsidy, labeling CS and PS. Why is there no deadweight loss in this case?



$$MB = 200 - \frac{1}{25}Q$$
 $MEB = 110$ $MC = 60 + \frac{1}{100}Q$

a) No policy. Given that there is no policy to address the externality, find the equilibrium quantity, price, consumer surplus, producer surplus, external benefit, and total economic surplus.

$$q = \underline{\hspace{1cm}} p = \underline{\hspace{1cm}} CS = \underline{\hspace{1cm}}$$
 $PS = \underline{\hspace{1cm}} EB = \underline{\hspace{1cm}} TES = \underline{\hspace{1cm}}$

Graph the market with no policy intervention, labeling CS^* , PS^* , and deadweight loss (DWL). Why is this area the deadweight loss?

b) Pigovian subsidy. To maximize total economic surplus, the government should offer a subsidy of $\sigma^o =$ per unit to the consumers. Given this, find the equilibrium quantity, price, consumer surplus, producer surplus, external benefit, government expenditure, and total economic surplus.

$$q =$$
_______ $p =$ ______ $CS =$ ______
 $PS =$ ______ $EB =$ ______ $GE =$ ______ $TES =$ ______

Graph the market with the subsidy, labeling CS and PS. Why is there no deadweight loss in this case?