Introductory Microeconomics
Homework 9: Externalities and Public Goods

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1. T/F. Coase's theorem states that all externalities will be solved by negotiation between parts.
2. T/F. Taxation can be used to restore efficiency in the presence of externalities.
3. T/F. What makes a good public is that it's produced by the public sector.
4. T/F. Private agents are unable to produce public goods.
5. T/F. The free rider problem can lead to the under-provision of public goods.
6. T/F. A good can be non-rival but still excludable.
7. An industry produces paper next to a river, generating pollution. Marginal social benefit, marginal private cost, and marginal social cost are given below.

$$\text{MSB} = 12 - q \qquad \text{MPC} = q \qquad \text{MSC} = 2q$$

   (a) Find the market quantity. What's the total social benefit and the total social cost? Find total welfare calculating its difference.
   (b) Find the efficient quantity. What's the total social benefit and the total social cost? Find total welfare calculating its difference.
   (c) Find the dead-weight loss of the externality.
   (d) Which tax to the producers will implement the efficient quantity?
   (e) Plot your answers.

8. A farmer grows crops in a field next to a rancher who raises cattle.

   - If the rancher's cattle stray, they trample the crops and cause $1000 in damages.
   - The rancher could build a fence on his side to prevent this, but it would cost $600.
   - The farmer cannot build a fence on their side. The farmer's crops are spread out across open land, making it costly or physically impractical to enclose the entire area.
   - The rancher receives $2000 in profit from grazing his cattle freely.
   - The farmer receives $2000 for his crops.

   Assume the rancher is not liable for his damage. Answer the following questions:

   (a) Will he build the fence? What are the profits the rancher and the farmer make?
   (b) Is this outcome efficient?
   (c) Show they can reach a deal to restore efficiency. What's the name of this result?

Now assume the rancher is liable for all the damages.

(d) What does he do now? What are the profits the rancher and the farmer make?

(e) Is this outcome efficient?

9. (Mankiw 11.7) Two neighboring towns are deciding to put on a firework display for the New Year. Fireworks cost $360. In each town, some people enjoy fireworks more than others. Consider first the town of Bayport where Frank's value for the show is $50, Joe's value is $100, and Callie's $300. Answer the following questions:

   (a) Does the show pass a cost-benefit analysis?

   (b) What would Bayport decide if they vote according to the majority rule and they decide to split the cost equally?

   Now consider the town of River Heights where Nancy's value for the show is $20, Bess's $140, and Ned's $160. Repeat (a) and (b).

10. (Mankiw 23.7) Five roommates are planning to spend the weekend in their apartment watching movies and they are debating how many movies to watch. The table below show their individual willingness to pay for each movie. Each movie costs $15 and they split the cost equally so they pay $3 each for a movie.

    (a) What's the efficient number of movies? That is, the number of movies that maximizes total surplus.

    (b) What's the favorite number of movies for each roommate?

    (c) Suppose they vote on two alternatives: 1) Watch 2 movies vs 2) Watch 3 movies. Which alternative wins under the majority rule?

	Ava	Bruce	Charli	Dua	Elena
First film	14	10	8	4	2
Second film	12	8	4	2	0
Third film	10	6	2	0	0
Forth film	6	2	0	0	0
Fifth film	2	0	0	0	0