

## Problem Set 2, due Tuesday, September 29<sup>th</sup>, 2015

### Excise tax

**1.** Demand and supply in the market for spicy sauce (which is perfectly competitive, etc.) are determined by the marginal benefit function  $MB = 70 - q$  and the marginal cost function  $MC = 10 + \frac{1}{2}q$ , where  $q$  is the quantity of spicy sauce.

For parts (a) and (b), suppose that there is no tax.

**a)** In the market equilibrium, the price is  $p^* =$  \_\_\_\_\_, and the quantity is  $q^* =$  \_\_\_\_\_.

**b)** Consumer surplus is  $CS =$  \_\_\_\_\_, producer surplus is  $PS =$  \_\_\_\_\_, and total economic surplus is  $TES =$  \_\_\_\_\_.

For parts (c) through (e), suppose that there is a tax of \$15 per unit.

**c)** In the market equilibrium, the price is  $p^* =$  \_\_\_\_\_, and the quantity is  $q^* =$  \_\_\_\_\_.

**d)** Consumer surplus is  $CS =$  \_\_\_\_\_, producer surplus is  $PS =$  \_\_\_\_\_, government revenue is  $GR =$  \_\_\_\_\_, total economic surplus is  $TES =$  \_\_\_\_\_, and deadweight loss is  $DWL =$  \_\_\_\_\_.

**e)** On the blank graph, draw the demand curve, supply curve, and the supply curve with the tax. Use different colors or patterns to shade in consumer surplus, producer surplus, government revenue, and deadweight loss.

**f)** With the imposition of this tax, why is more lost in consumer and producer surplus than what is gained in government revenue?

**2.** Demand and supply in the market for fresh pasta (which is perfectly competitive, etc.) are determined by the marginal benefit function  $MB = 120 - 2q$  and the marginal cost function  $MC = 2q$ , where  $q$  is the quantity of spicy sauce.

For parts (a) and (b), suppose that there is no tax.

**a)** In the market equilibrium, the price is  $p^* =$  \_\_\_\_\_, and the quantity is  $q^* =$  \_\_\_\_\_.

**b)** Consumer surplus is  $CS =$  \_\_\_\_\_, producer surplus is  $PS =$  \_\_\_\_\_, and total economic surplus is  $TES =$  \_\_\_\_\_.

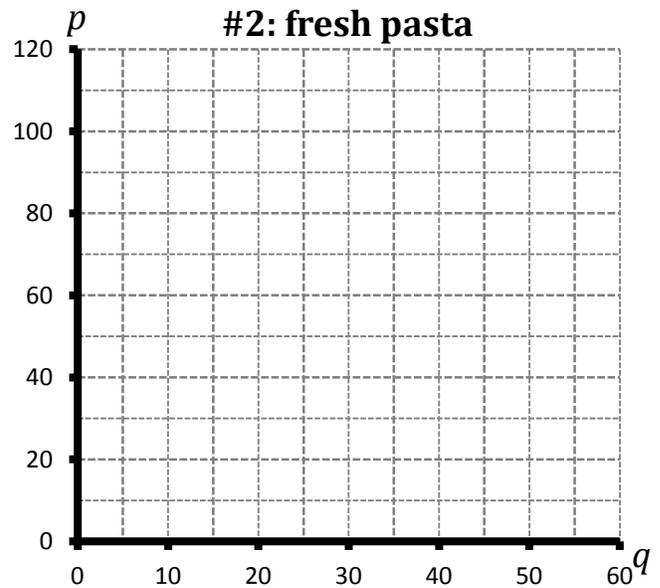
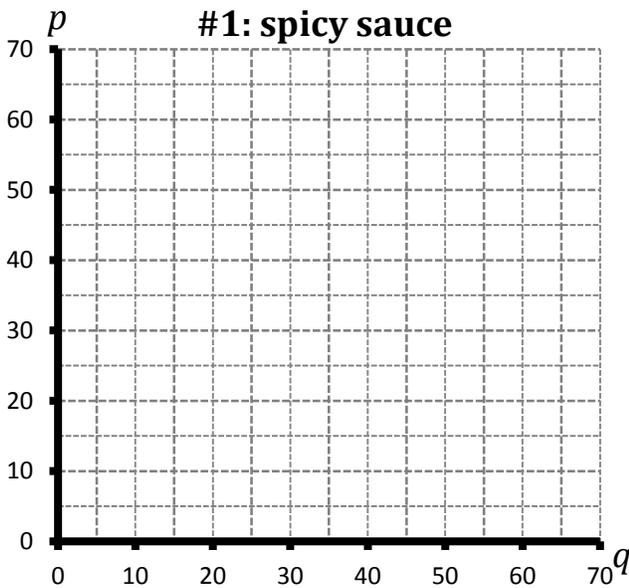
For parts (c) through (e), suppose that there is a tax of \$40 per unit.

**c)** In the market equilibrium, the price is  $p^* =$  \_\_\_\_\_, and the quantity is  $q^* =$  \_\_\_\_\_.

**d)** Consumer surplus is  $CS =$  \_\_\_\_\_, producer surplus is  $PS =$  \_\_\_\_\_, government revenue is  $GR =$  \_\_\_\_\_, total economic surplus is  $TES =$  \_\_\_\_\_, and deadweight loss is  $DWL =$  \_\_\_\_\_.

**e)** On the blank graph, draw the demand curve, supply curve, and the supply curve with the tax. Use different colors or patterns to shade in consumer surplus, producer surplus, government revenue, and deadweight loss.

Excise tax graphs



## Price controls

**3.** Demand and supply in the market for mystical soda (which is perfectly competitive, etc.) are determined by the marginal benefit function  $MB = 60 - 3q$  and the marginal cost function  $MC = 20 + q$ , where  $q$  is the quantity of mystical soda.

For parts (a) and (b), suppose that there is no price control.

**a)** In the market equilibrium, the price is  $p^* =$  \_\_\_\_\_, and the quantity is  $q^* =$  \_\_\_\_\_.

**b)** Consumer surplus is  $CS =$  \_\_\_\_\_, producer surplus is  $PS =$  \_\_\_\_\_, and total economic surplus is  $TES =$  \_\_\_\_\_.

For parts (c) through (e), suppose that there is a price floor of \$36 per unit.

**c)** In the market equilibrium, the price is  $p^* =$  \_\_\_\_\_, and the quantity is  $q^* =$  \_\_\_\_\_.

**d)** Find the excess supply or demand: Excess \_\_\_\_\_ of \_\_\_\_\_.

**e)** Consumer surplus is  $CS =$  \_\_\_\_\_, producer surplus is  $PS =$  \_\_\_\_\_, total economic surplus is  $TES =$  \_\_\_\_\_, and deadweight loss is  $DWL =$  \_\_\_\_\_.

**f)** On the blank graph, draw the demand curve, supply curve, and the price floor. Use different colors or patterns to shade in consumer surplus, producer surplus, and deadweight loss.

**g)** If the price floor is removed, *why* do we expect the market equilibrium price to return to its value in part (a)? Or, in other words, why is this an equilibrium in the first place? Try to explain as clearly as possibly why alternative prices cause market pressures that push in the direction of this value.

**h)** Further, explain why the market equilibrium in (a) is Pareto efficient, such that no one can be made better off without someone else being made worse off.

**4.** Demand and supply in the market for laser candy (which is perfectly competitive, etc.) are determined by the marginal benefit function  $MB = 20 - \frac{1}{2}q$  and the marginal cost function  $MC = 5 + \frac{1}{4}q$ , where  $q$  is the quantity of laser candy.

For parts (a) and (b), suppose that there is no price control.

**a)** In the market equilibrium, the price is  $p^* =$  \_\_\_\_\_, and the quantity is  $q^* =$  \_\_\_\_\_.

**b)** Consumer surplus is  $CS =$  \_\_\_\_\_, producer surplus is  $PS =$  \_\_\_\_\_, and total economic surplus is  $TES =$  \_\_\_\_\_.

For parts (c) through (e), suppose that there is a price ceiling of \$8 per unit.

**c)** In the market equilibrium, the price is  $p^* =$  \_\_\_\_\_, and the quantity is  $q^* =$  \_\_\_\_\_.

**d)** Find the excess supply or demand: Excess \_\_\_\_\_ of \_\_\_\_\_.

**e)** Consumer surplus is  $CS =$  \_\_\_\_\_, producer surplus is  $PS =$  \_\_\_\_\_, total economic surplus is  $TES =$  \_\_\_\_\_, and deadweight loss is  $DWL =$  \_\_\_\_\_.

**f)** On the blank graph, draw the demand curve, supply curve, and the price ceiling. Use different colors or patterns to shade in consumer surplus, producer surplus, and deadweight loss.

Price control graphs

