Name:
Section 1.4 - In class example
Math 151 – Spring 2018

1. A company with fixed costs of \$6000 and marginal costs of \$10/*item* sells goods at \$12 per item.

   (a) Write down the cost and revenue as functions of the quantity, q.

   $C(q) = 6,000 + 10q$

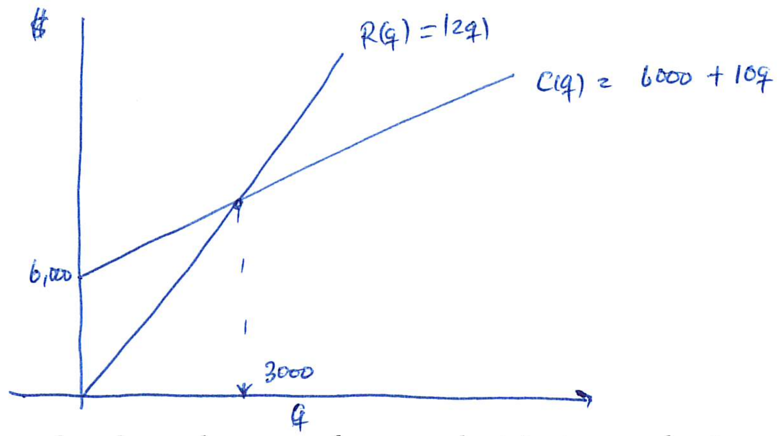
   $R(q) = 12q$

   (b) Find the break-even point and illustrate it graphically.

   At break-even COSTS = REVENUE

   $6000 + 10q = 12q$

   $6000 = 12q - 10q \Rightarrow 6000 = 2q \Rightarrow q = 3000$ items



2. The demand and supply curves for a product in terms of price, p are

$$q = 2500 - 20p, \quad q = 10p - 500$$

   (a) Find the equilibrium price and quantity.

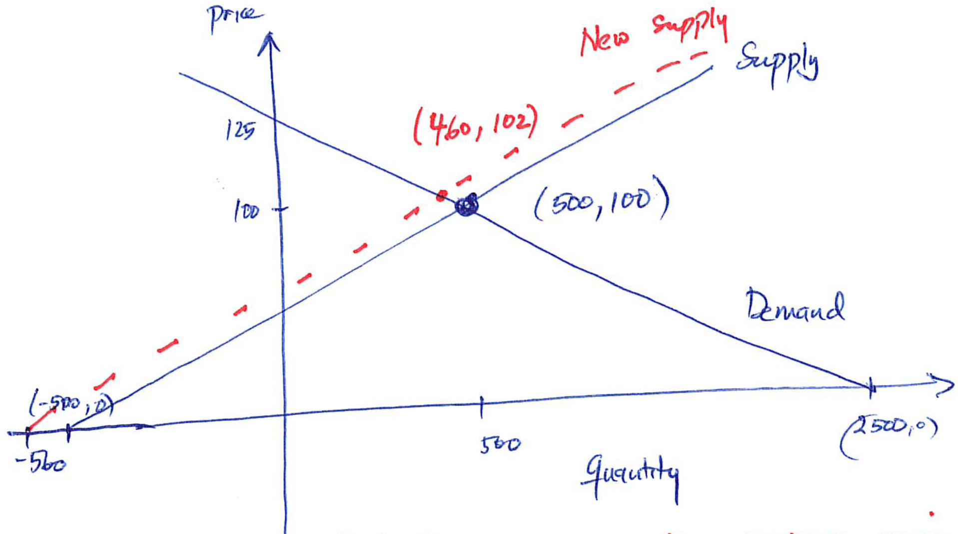
   @ equilibrium, supply = demand.

   $10p - 500 = 2500 - 20p$

   $30p = 3000 \Rightarrow p = \frac{3000}{30} = 100$

   $q = 10p - 500$
   $= 1000 - 500 = 500$ items

(b) Illustrate your the equilibirum price and quantity from part (a) on a graph.



Supply
$q = 10p - 500$

Demand
$q = 2500 - 20p$

Always remember that price goes on the vertical axis

(c) A specific tax of \$6 per unit is imposed on the suppliers. Find the new equilibrium price and quantity. Represent your solution on your graph in part (b).

The tax is imposed on the suppliers, the supply equation is modified to reflect the effect of taxes

Original supply equation is $q = 10p - 500$.

After tax $q = 10(\text{amount recieved}) - 500 \Rightarrow q = 10(p-6) - 500 = 10p - 560$

Demand equation is unchanged so $10p - 560 = 2500 - 20p$

$30p = 3060 \Rightarrow p = \$102, \; q = 460.$

(d) How much of the \$6 tax is paid by the consumers and how much by producers?

Consumers pay \$2 more because the price goes up to \$102 from \$100.

The suppliers pay \$4 of the tax

(e) What is the total revenue received by the government?

Tax Revenue = Quantity sold × Tax per item

$460 \cdot 6 = \$2760.$