Example problem:

Consumer and Producer Surplus: Find the consumer and producer surplus for the case below:

P1(x) = 200 – 0.02x^2 P2(x) = 100 +x

Step 1: the starting point in determining a solution is to find the intersection of the 2 price functions. By setting P1(x) = P2(x) we obtain the following equation x.

 200 – 0.02x^2 = 100 + x

Or multiplying both sides by 50 the equation becomes:

 10,000 – x^2 = 5000 + 50x

Solving for x gives:

 0 = -10,000 + x^2 +5000 + 50x = x^2 + 50x – 5000 = (x + 100)(x – 50)

The 2 roots are x = -100 and x = 50. Since we expect to produce positive numbers of items and it is impossible to produce a negative demand, the only root that makes sense is the root x = 5-. This is the equilibrium demand and the associated price is the equilibrium price. That is,

P2(50) = 100 + 50 = $150.

Step 2: The next step is to determine the price function that is above the equilibrium price of $150. The price function P1(x) > 150 for all x < 50. Also, the price function P2(x) = 100 + x < 150 for all x < 0. The consumer surplus lies above the equilibrium and is computed using the definite integral…etc. etc.