Exercise ME-221

Computing social surplus at a market equilibrium

The Economic Skills Project

1 Problem

Problem

Given the market demand and supply curves below, find the market equilibrium and compute the social surplus.

- $Q^D = 900 - 3P$
- $Q^S = P - 100$

2 Answer

Answer

Here's the numerical solution:

- $SS = \$15,000$

3 Method
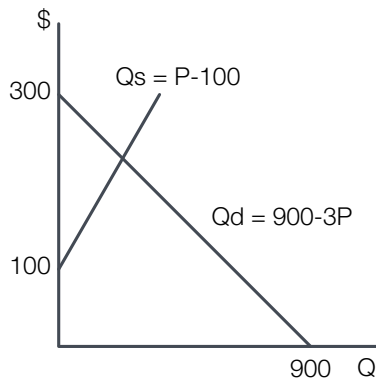
Solution method

Here's one approach:

1. Draw the graph with variables for the equilibrium price and quantity.

2. Solve for the equilibrium.

3. Add the numerical values of P and Q to the graph.

4. Compute the area of the triangle between the Y axis and the equilibrium.

4 Solution

4.1 Step 1

Draw the graph with variables for the equilibrium price and quantity

Here's how it looks:

4.2 Step 2

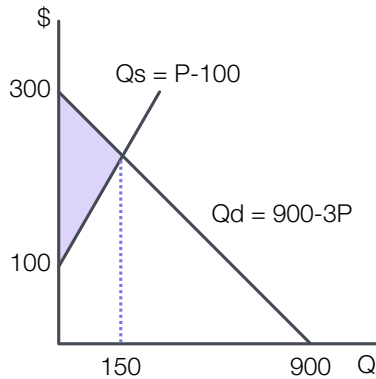**Solve for the equilibrium**

Start with the equilibrium condition $Q^D = Q^S$, insert the demand and supply equations, and then solve for P_e:

- $Q^D = Q^S$

- $900 - 3P = P - 100$

- $1000 = 4P$

- $P = 250$

- $Q^D = 900 - 3 \cdot 250 = 150$

- Checking: $Q^S = 250 - 100 = 150$

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4.3 Step 3

Add the numerical values of P and Q to the graph

The social surplus is the shaded area below.

4.4 Step 4

Compute the area of the triangle between between the Y axis and the equilibrium

Computing it using the formula for the area of a triangle with the difference between the Y intercepts inserted as the base and the equilibrium quantity inserted as the height:

- SS $= \frac{1}{2}bh$

- SS $= \frac{1}{2} \cdot (300 - 100) \cdot 150$

- SS $= \$15,000$

Everything checks - done!