

Exercise MD-201

Computing an elasticity from a demand equation

The Economic Skills Project

1 Problem

Problem

Given the information below, compute Q_1 and Q_2 and then solve for the demand elasticity η between the two points.

Demand $Q = 100 - 2P$

Initial price $P_1 = 10$

Final price $P_2 = 30$

2 Answer

Answer

Here's the numerical solution:

- $Q_1 = 80$
- $Q_2 = 40$
- $\eta = -0.25$

3 Method

Solution method

Here's one approach:

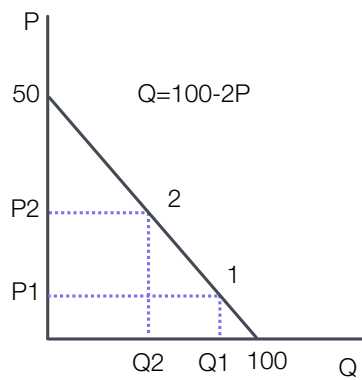
1. Draw the graph
2. Compute Q_1 and Q_2
3. Compute the percentage change in P and Q from point 1 to point 2
4. Compute the elasticity

4 Solution

4.1 Draw the graph

Draw the graph

Here's how it looks:



4.2 Compute quantities

Compute quantities

Find Q_1 :

- $Q_1 = 100 - 2P_1$
- $Q_1 = 100 - 2(10) = 80$

Find Q_2 :

- $Q_2 = 100 - 2P_2$
- $Q_2 = 100 - 2(30) = 40$

4.3 Compute percent changes

Compute percent changes

Find $\% \Delta P$:

- $\% \Delta P = \frac{P_2 - P_1}{P_1} = \frac{30 - 10}{10}$
- $\% \Delta P = \frac{20}{10} = 2$ or 200%

Find $\% \Delta Q$:

- $\% \Delta Q = \frac{Q_2 - Q_1}{Q_1} = \frac{40 - 80}{80}$
- $\% \Delta Q = -\frac{40}{80} = -0.5$ or -50%

4.4 Compute the elasticity

Compute the elasticity

Definition of η :

- $\eta = \frac{\% \Delta Q}{\% \Delta P}$

Inserting values of $\% \Delta P$ and $\% \Delta Q$:

- $\eta = -\frac{0.5}{2} = -0.25$

Alternatively, in percentages:

- $\eta = -\frac{50\%}{200\%} = -0.25$

Done!