Price Elasticity of Demand

1 Formula

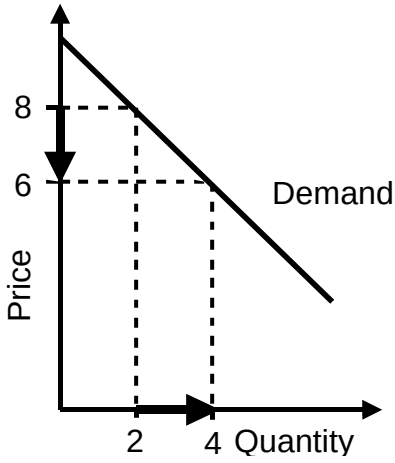
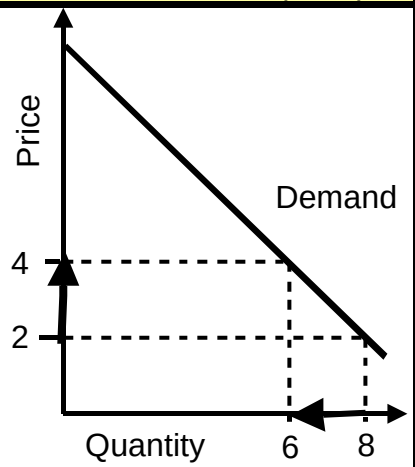
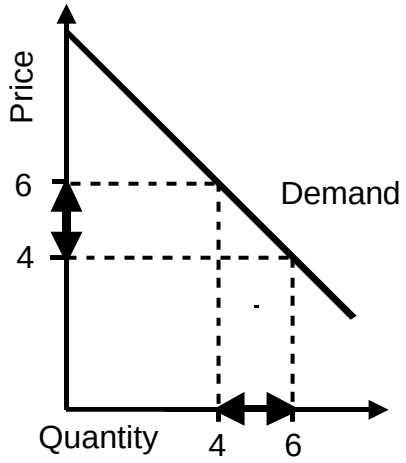
- **Price elasticity of demand (e)** = $\frac{\text{\% change in quantity demanded}}{\text{\% change in price}}$

- This elasticity **shows** how quantity demanded and total revenue are affected by changes in price. Question: Should prices be increased or decreased in order to maximize total revenue?

- **Absolute** values are used although the price elasticity of demand is actually negative if the demand curve is downward sloping.

- Demand is **elastic**, if e > 1, and **inelastic,** if e < 1.

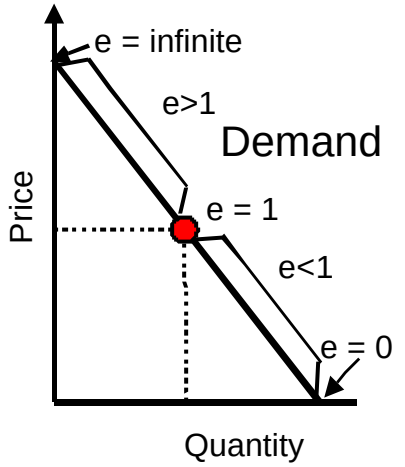
2 Elasticity and total revenue

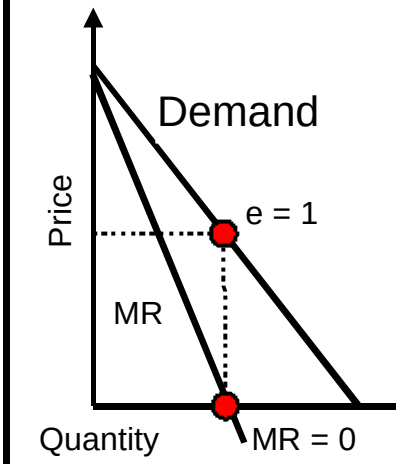
elastic demand (e > 1)	**inelastic** demand (e < 1)	**unit** elastic demand (e = 1)
		
$e = \frac{2/3}{2/7} = 2.33$	$e = \frac{2/7}{2/3} = 0.43$	$e = \frac{2/5}{2/5} = 1$
(3 and 7 are midpoints)	(7 and 3 are midpoints)	(5 and 5 are midpoints)
Total revenue (= P * Q): Price 8: 8 * 2 = 16 Price 6: 6 * 4 = 24	**Total revenue** (= P * Q): Price 2 2 * 8 = 16 Price 4: 4 * 6 = 24	**Total revenue** (= P * Q): Price 4 4 * 6 = 24 Price 6: 6 * 4 = 24
➡ A **lower** price results in a **higher** total revenue.	➡ A **higher** price results in a **higher** total revenue.	➡ A change in price does **not affect** total revenue.

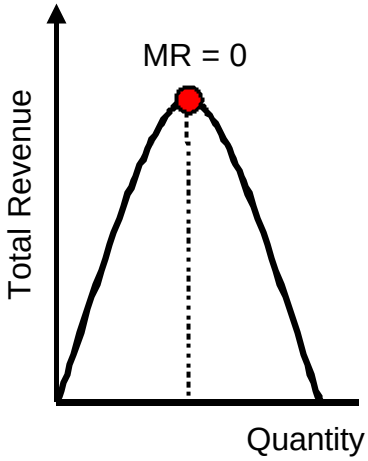
3 Effect of changes in price on total revenue (TR)

	Price Elasticity of Demand		
	e > 1	**e < 1**	**e = 1**
Price **increase**	TR falls	TR rises	TR unchanged
Price **decrease**	TR rises	TR falls	TR unchanged

4 Elasticity, demand curve, marginal revenue (MR) and total revenue (TR)

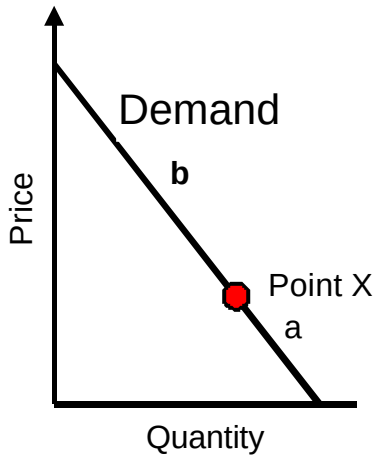






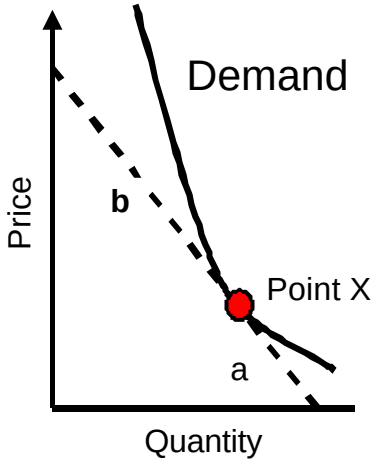
5 Measuring the price elasticity of demand

Demand is a **straight line**.



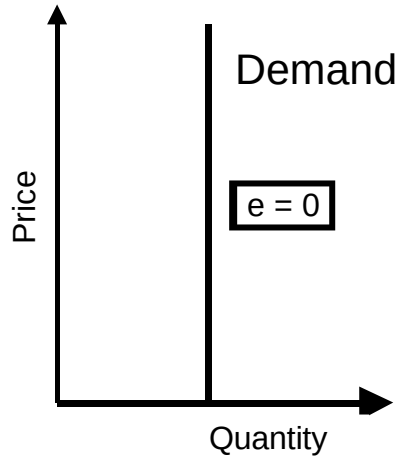
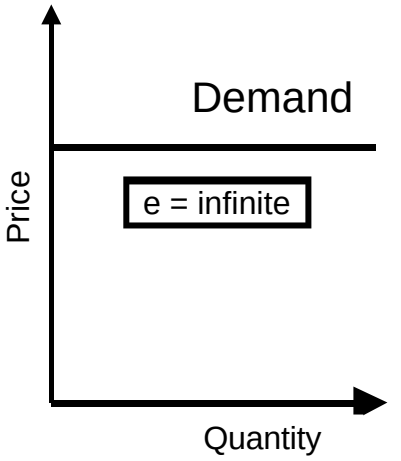
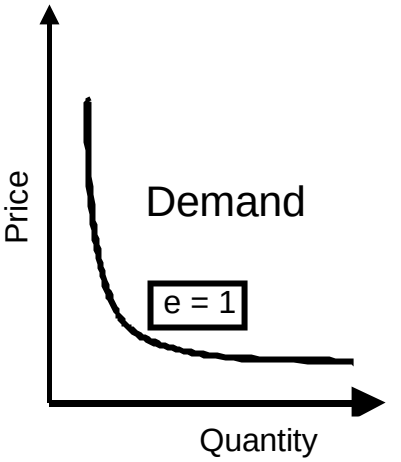
$e = \frac{\text{length of line a}}{\text{length of line b}}$

Demand is a **curve.**

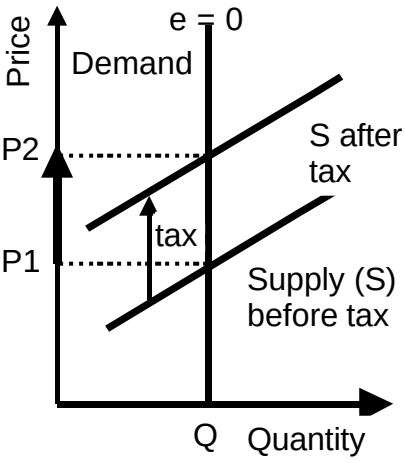
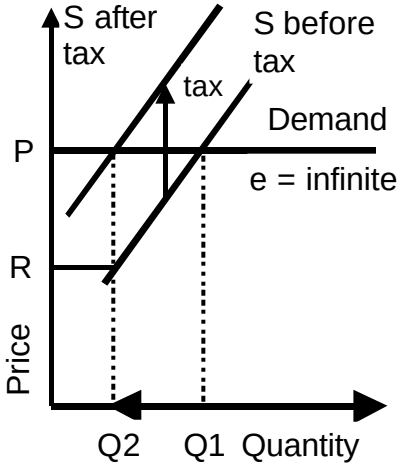
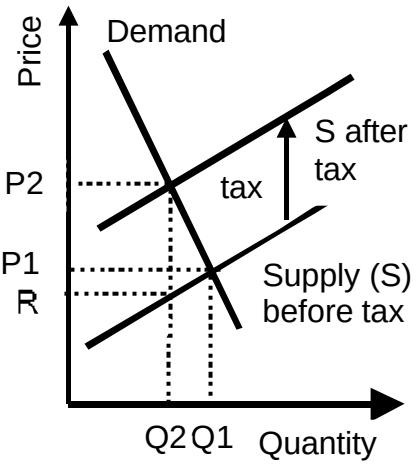


$e = \frac{\text{length of line a}}{\text{length of line b}}$
(of the tangent to the demand curve at point X)

6 Special cases of constant elasticity

Perfectly inelastic demand	**Perfectly elastic** demand	**Unit elastic** demand
		

7 Effects of a (per unit) tax

Perfectly inelastic demand	**Perfectly elastic** demand	**(in)elastic** demand
		
Price rises from P1 to P2, quantity remains unchanged. P1 is the net receipt (= Price 2 minus tax) of the seller after tax which is equal to the price before tax.	Price remains unchanged, quantity falls from Q1 to Q2. R is the net receipt of the seller after tax which is less than the price (and receipt) before tax.	Price rises from P1 to P2, quantity falls from Q1 to Q2. R is the net receipt of the seller after tax.
The tax is **carried** completely **by the buyer**.	The tax is **carried** completely **by the seller.**	The tax is **carried by both** the buyer (= P2 minus P1) and the seller (= P1 minus R).