

1. The demand for a quantity A is $q_1 = 16 - 3p_1 - 2p_2^2$. Find (i) the partial elasticities η_1 and η_{12} (ii) the partial elasticities for $p_1 = 2$ and $p_2 = 1$.
2. The demand for a commodity A is $q_1 = 10 - 3p_1 - 2p_2$. Find the partial elasticities when $p_1 = p_2 = 1$.
3. The demand for a commodity X is $q_1 = 15 - p_1^2 - 3p_2$. Find the partial elasticities when $p_1 = 3$ and $p_2 = 1$.
4. The demand function for a commodity Y is $q_1 = 12 - p_1^2 + p_1p_2$. Find the partial elasticities when $p_1 = 10$ and $p_2 = 4$.

In problems 5 through 7, the demand functions for a pair of commodities are given. Use partial derivatives to determine whether the commodities are substitute, complementary, or neither.

5. $q_1 = 500 - 6p_1 + 5p_2$; $q_2 = 200 + 2p_1 - 5p_2$

6. $q_1 = 3000 + \frac{400}{p_1+3} + 50p_2$; $q_2 = 2000 - 100p_1 + \frac{500}{p_2+4}$

7. $q_1 = 200p_1^{-1/2}p_2^{-1/2}$; $q_2 = 300p_1^{-1/2}p_2^{-1/2}$