

2. The following is a table showing Dana’s marginal benefit from purchasing bottles of water and good X from a grocery store.

Quantity of Water (in bottles)	Marginal Benefit of Water (in dollars)		Quantity of Good X (in units)	Marginal Benefit of Good X (in dollars)
1	24		1	24
2	18		2	18
3	12		3	12
4	6		4	6
5	3		5	3

- (a) What is Dana’s total benefit from purchasing 2 bottles of water and 1 unit of good X? Show your work.
- (b) Assume the price of a unit of good X is \$5. Calculate the total consumer surplus if Dana purchases 3 units of good X. Show your work.
- (c) Now assume the price of a bottle of water is \$3 and the price of a unit of good X is \$6. Dana spends her entire budget of \$30 on bottles of water and good X.
- (i) Explain why Dana does not maximize her benefit when she purchases 2 bottles of water and 4 units of good X. Use marginal analysis to explain your answer.
- (ii) What are the optimal quantities of good X and bottles of water at these prices?
- (iii) Suppose the price of a unit of good X drops to \$3. Calculate Dana’s cross-price elasticity of demand for bottles of water with respect to the price of good X, and state whether the two goods are substitutes or complements. Show your work.