Utility Maximization with Perfect Substitutes 3

Consider a consumer who views two goods x_1 and x_2 as perfect substitutes The consumer regards one unit of x_1 as equivalent to two units of x_2 The prices are $p_1 = 6$ and $p_2 = 3$ and the income is $M = 90$ Determine the optimal consumption bundle.

Solution

Since the goods are perfect substitutes the indifference curves are linear with a constant slope Given that one unit of x_1 is equivalent to two units of x_2 the slope of the indifference curve is

$$MRS = 2$$

The slope of the budget line is determined by the price ratio

$$Slope_{budget} = \frac{p_1}{p_2} = \frac{6}{3} = 2$$

Since the slopes are equal the consumer is indifferent among all bundles on the budget line Any bundle satisfying

$$6x_1 + 3x_2 = 90$$

is optimal For example spending all income on x_1 yields

$$x_1^* = \frac{90}{6} = 15 \quad x_2^* = 0$$

or spending all income on x_2 yields

$$x_1^* = 0 \quad x_2^* = \frac{90}{3} = 30$$