

What are Indifference Curves?

Worksheet

An indifference curve maps pairs of goods (quantity of good X and good Y) that yield the same total utility. The slope, called Marginal Rate of Substitution (MRS), equals the ratio of marginal utilities: $MRS = -\Delta Y/\Delta X = MU_x/MU_y$.

$$MRS = -\Delta Y/\Delta X = MU_x/MU_y$$

MRS = Marginal Rate of Substitution (ratio)

ΔY = Change in good Y quantity (units)

ΔX = Change in good X quantity (units)

MU_x = Marginal utility of good X (util)

MU_y = Marginal utility of good Y (util)

Questions

1. What does a point on an indifference curve represent?
A) Maximum income
B) Equal utility with other points on the curve
C) Different utility levels
D) Budget constraint
2. If $MU_x = 30$ and $MU_y = 10$, what is the MRS?
A) 3
B) 0.33
C) 30
D) 10
3. Why are indifference curves typically convex?
A) Income effect
B) Diminishing MRS — goods become less substitutable as you have more of one
C) Price effect
D) Demand curve
4. Higher indifference curves represent...
A) Lower satisfaction
B) The same satisfaction
C) Higher satisfaction
D) No preference
5. Good X gives $MU_x = 18$, good Y gives $MU_y = 6$. What is the MRS?
6. Bundle A: (5 pizzas, 10 sodas). If $MU_{\text{pizza}} = 20$ and $MU_{\text{soda}} = 5$, are they indifferent to (7 pizzas, 8 sodas)?
7. At bundle (8, 12), $MRS = 2$. How many units of Y does the consumer give up for 3 more X?
8. Define: What is an indifference curve?
9. Define: What is MRS?
10. Define: Why do indifference curves slope downward?

Answer Key

1. B) Equal utility with other points on the curve — All points on one indifference curve give the same total satisfaction.
2. A) 3 — $MRS = MU_x/MU_y = 30/10 = 3$.
3. B) Diminishing MRS — goods become less substitutable as you have more of one — As you consume more X, you're willing to give up less Y (diminishing MRS).
4. C) Higher satisfaction — Farther from origin = more total consumption = higher utility.
5. $MRS = MU_x / MU_y = 18 / 6 = 3$ Consumer trades 3 units of Y for 1 unit of X.
6. $MRS = 20/5 = 4$ (trade 4 sodas for 1 pizza) From A to new bundle: $\Delta\text{pizza} = +2$, $\Delta\text{soda} = -2$
Trade ratio = $2/2 = 1$, but $MRS = 4$. Not on same indifference curve.
7. $MRS = 2$ means 2 units of Y per 1 unit of X For 3 units of X: $\Delta\text{soda} = 3 \times 2 = 6$ Give up 6 units of Y.
8. A curve showing all bundles of two goods giving equal satisfaction to a consumer.
9. Marginal Rate of Substitution — the slope of the indifference curve, = MU_x/MU_y .
10. To maintain equal utility, more of one good requires less of the other.

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