Income & Cross-Price Elasticity

AP Microeconomics | Unit 2 | two elasticities where the sign is the answer

Running example. Everyone's income rises by 10%. People buy 20% more restaurant meals, 4% more bread, and 5% fewer instant noodles.

1. Income elasticity of demand

Income elasticity

$$E_I = \frac{\%\,\Delta Q_d}{\%\,\Delta \text{income}}$$

restaurant meals	$\frac{+20\%}{+10\%} = +2.0$	positive, above 1	normal good, a **luxury**
bread	$\frac{+4\%}{+10\%} = +0.4$	positive, between 0 and 1	normal good, a **necessity**
instant noodles	$\frac{-5\%}{+10\%} = -0.5$	negative	**inferior** good

Read the *sign* first (positive = normal, negative = inferior), then the *size*.

2. Cross-price elasticity

Cross-price elasticity

$$E_{xy} = \frac{\%\,\Delta Q_d \text{ of good } X}{\%\,\Delta P \text{ of good } Y}$$

price of tea +10%, coffee demanded +5%	+0.5	positive: **substitutes**
price of printers +10%, ink demanded −8%	−0.8	negative: **complements**
	0	unrelated goods

3. Here the sign is the answer

	on the bottom	sign	how to read it
Price elasticity of demand	the good's own price	dropped	compare with 1
Income elasticity	income	**kept**	+ normal, − inferior
Cross-price elasticity	the other good's price	**kept**	+ substitutes, − complements

4. A worked exam question

Income rises from $40,000 to $50,000; a household's gym visits rise from 8 to 12 a month.

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$$\%\,\Delta\text{income} = \frac{50{,}000 - 40{,}000}{40{,}000} = +25\%, \qquad \%\,\Delta Q_d = \frac{12 - 8}{8} = +50\%, \qquad E_I = \frac{+50\%}{+25\%} = +2.0$$

Positive, so gym visits are a **normal** good; greater than 1, so they are a **luxury**. The classification, not the number alone, earns the point.

5. Midpoints, size, and two changes at once

Midpoint method. Income \$40,000 to \$50,000, quantity 300 to 360: $\%\Delta Q = \frac{60}{330} \approx 18.2\%$, $\%\Delta I = \frac{10{,}000}{45{,}000} \approx 22.2\%$, so $E_I \approx 0.82$. Below 0: inferior; 0 to 1: a necessity (normal, income-inelastic); above 1: a luxury.

Size matters. A cross-price elasticity of +2.0 means close substitutes; +0.1 means weak substitutes. The sign gives the relationship, the size its strength. If income and every price rise by the same percent, buying power and relative prices are unchanged, so quantities do not change.

Two changes at once. Income elasticity 1.2, cross-price elasticity with a complement −0.8; income and the complement's price both rise 5%: $+6\% - 4\% = +2\%$. With equal-size changes, the larger elasticity in absolute value decides the direction.

Where students lose points

1. Dropping the sign: here the sign is the classification.
2. Mixing up the signs: + is substitutes, − is complements.
3. Putting the wrong good's price on the bottom.
4. Calling a good "inferior" because the number is below 1 (inferior means negative).
5. Stopping at the number: classify the good in words.

Now practise it

Theory sticks once you use it. On **sad-academy.com** you'll find practice questions for this exact subtopic in the AP format, and an AI that grades your free-response answers against the scoring guidelines, the way an AP reader would.

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