

Exercise Set 7
BUDGET CONSTRAINT

III. Questions

Given: The price of a unit of Good 1 is \$20. The price of a unit of Good 2 is \$5. The consumer's income is \$100.

1. Sketch the consumer's budget constraint (with Q_1 on the horizontal axis.) Indicate the intercepts and slope.

[*Note: Verify that the slope is equal to $-P_1/P_2$.*]

Equation for the budget constraint:

$$\text{Expenditure} = \text{Income}$$

$$20Q_1 + 5Q_2 = 100$$

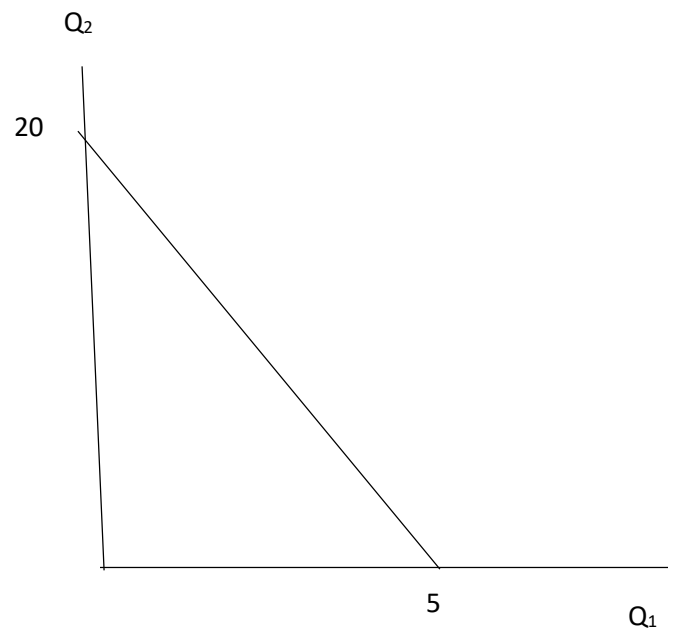
To find horizontal intercept, set $Q_2 = 0$.

$$20Q_1 = 100$$

$$Q_1 = 5$$

Similarly, the vertical intercept is 20.

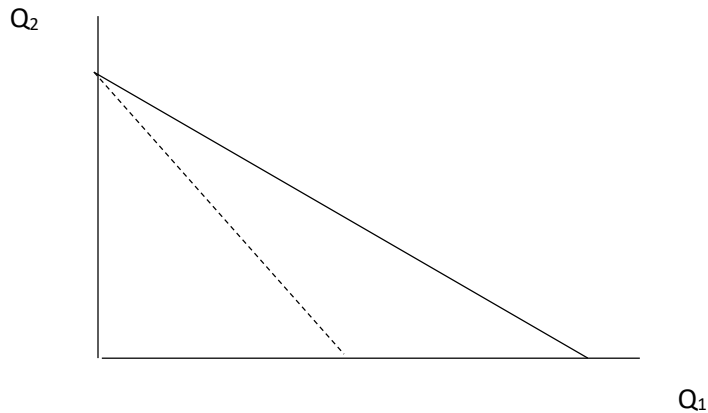
$$\begin{aligned} \text{Slope} &= -1(\text{Vertical intercept})/\text{Horizontal intercept} \\ &= -4 \end{aligned}$$



Note: The ratio of prices is $20/5 = 4$, which is the magnitude of the slope.

2. "An increase in P_1 , *ceteris paribus*, will cause the horizontal intercept to increase and the budget constraint to rotate outwards." What is wrong with the statement? Provide a sketch.

The horizontal intercept will decrease (not increase), and the constraint will rotate inwards (not outwards). [Note: In all figures, dashed line indicates the new budget constraint.]



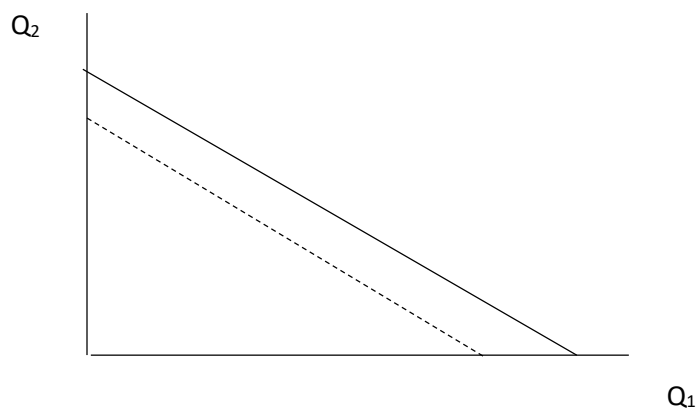
3. Go back to the original prices and income. Suppose income falls by 10%. What is the effect on the intercepts and slope of the budget constraint? Provide a sketch of the old and new constraints.

New value of income = 90

$$\text{Horizontal intercept} = 90/20 = 4.5$$

$$\text{Vertical intercept} = 90/5 = 18$$

$$\text{Slope} = -18/4.5 = -4$$



Result: A decrease in income causes the constraint to shift to the left. No change in the slope.

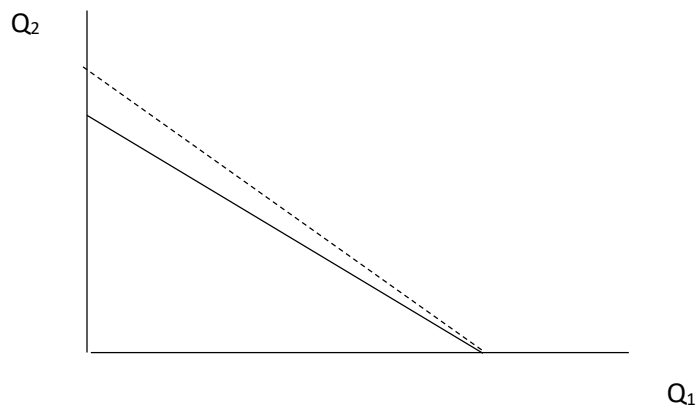
4. Go back to the original prices and income. If the price of Good 2 falls by 20%, *ceteris paribus*, what will happen to the intercepts and slope of the budget constraint? Sketch the old and new constraints.

New value of $P_2 = 4$

Horizontal intercept = $100/20 = 5$ (same as in Question 1)

Vertical intercept = $100/4 = 25$

Slope = $-25/5 = -5$



Result: A fall in the price of Good 2 causes the constraint to rotate outwards. It becomes steeper.