

2. Ans: - Given

- Income (I) = \$100

- price of bread (P_b) = \$2 per loaf

- price of book (P_k) = \$10 per book.

Marty's initial budget line:

Formula: $I = [P_b \times Q_b] + [P_k \times Q_k]$

$$100 = 2Q_b + 10Q_k$$

- If she spends all on bread:

$$Q_b = 100/2 = 50 \text{ loaves}$$

- If she spends all on books:

$$Q_k = 100/10 = 10 \text{ books}$$

So, the budget line connects the points.

- [50 loaves of bread, 0 books]

- [0 loaves of bread, 10 books]

Opportunity cost.

- 1 book = 5 loaves of bread [since 10 books $\leftrightarrow$ 50 bread]

- 1 loaf of bread = $1/5$ book = 0.2 books.

Effect of changes:

let's analyze three possible changes.

① Income increases to \$120

$$120 = 2Q_b + 10Q_k$$

- $Q_b = 120/2 = 60$

- $Q_k = 120/10 = 12$

$\rightarrow$ Budget line shifts outward & parallel (same slope).

Opportunity cost remains unchanged (1 book = 5 loaves)

⑤ price of bread rises to \$4 (income = \$100, book = \$10)

$$100 = 4\phi_b + 10\phi_k$$

$$\phi_b = 100/4 = 25 \text{ loaves}$$

$$\phi_k = 10 \text{ books}$$

→ The budget line rotates inward on the bread axis.

New opportunity cost:

$$1 \text{ book} = 2.5 \text{ loaves of bread}$$

⑥ price of books falls to \$5 (income = \$100, bread = \$2)

$$100 = 2\phi_b + 5\phi_k$$

$$\phi_b = 50 \text{ loaves}$$

$$\phi_k = 20 \text{ books}$$

→ The budget line rotates outward on the book axis.

New opportunity cost:

$$1 \text{ book} = 2.5 \text{ loaves of bread}$$

