

Q. A man wants to cut three lengths from a single piece of board of length 91 cm. The second length is to be 3 cm longer than the shortest and the third length is to be twice as long as the shortest. What are the possible lengths of the shortest board if the third piece is to be at least 5 cm longer than the second?

Sol. Let us assume, length of the shortest piece be x cm.

Acc. to question, length of second piece = $(x+3)$ cm.

length of third piece = $2x$ cm.

given, as all lengths are to be cut from a single piece of board having a length of 91 cm.

$$\therefore x + (x+3) + 2x \leq 91 \text{ cm}$$

$$= 4x + 3 \leq 91$$

$$= 4x \leq 88$$

$$= \frac{4x}{4} \leq \frac{88}{4}$$

$$x \leq 22 \quad \text{--- (i)}$$

Also given that the third piece is at least 5 cm longer than the second piece.

$$\therefore 2x \geq (x+3) + 5$$

$$2x \geq x + 8$$

$$x \geq 8$$

$$\text{--- (ii)}$$

by eqⁿ (i) & (ii)

$$8 \leq x \leq 22$$

Hence, the length of the shortest board is greater than or equal to 8 cm and less than or equal to 22 cm.