

Chapter 09

ALGEBRAIC EXPRESSION & IDENTITIES

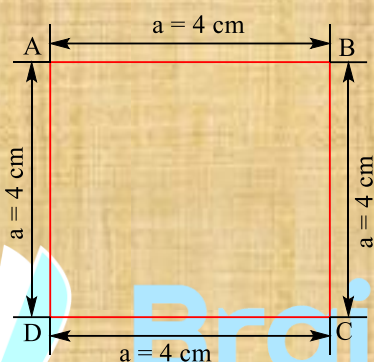
Identity- III:

Geometrically Proof:

$$a^2 - b^2 = (a - b)(a + b)$$

Step- 1:

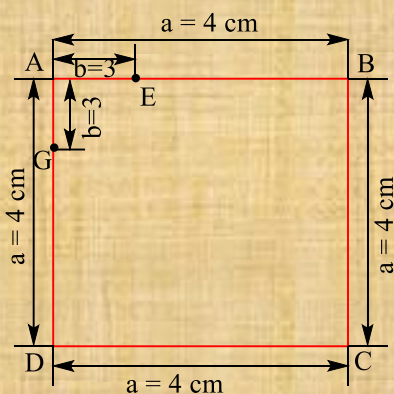
Draw a square ABCD of side $a = 4$ cm on a graph paper.



Step- 2:

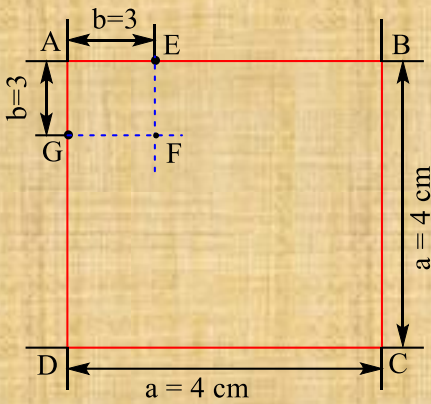
Mark points E and G on sides AB and AD such that

$AE = AG = b = 3$ cm, where $b < a$.



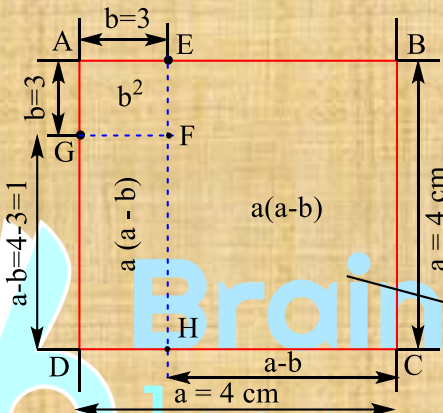
Step- 3:

Draw vertical lines from 'E' and from 'G'. Point of intersection be 'F'.



Step- 4:

Extend 'EF' to 'DC' which meets at 'H'.



- Highlight square AEFG colour it and mention Area b^2
- Highlight square ABCD and mention Area a^2 out side of the box by arrow mark.
- Highlight rectangle GFHD colour it and mention area $(a-b)b$.
- Highlight rectangle EBCH colour it and mention Area $a(a-b)$.

$\therefore$ Area of GFEBCH = Area of Rectangle GFHD + Area of Rectangle EBCH.

$$a^2 - b^2 = (a-b)b + a(a-b)$$

$$a^2 - b^2 = (a - b)[b + a]$$

Observation:

$$a^2 - b^2 = (a - b)(a + b)$$

i.e.,

$$4^2 - 3^2 = (4 - 3)(4 + 3) = (1)(7)$$

$$\Rightarrow 16 - 9 = 7$$

$$\Rightarrow \boxed{7 = 7}$$

