

LC 2017: PAPER 2

QUESTION 5 (25 MARKS)

Question 5 (a)

Consider $\triangle AFE$:

$$|\angle AEF| = 90^\circ$$

Let $|\angle FAE| = \theta$

$$\therefore |\angle EFA| = 90^\circ - \theta$$

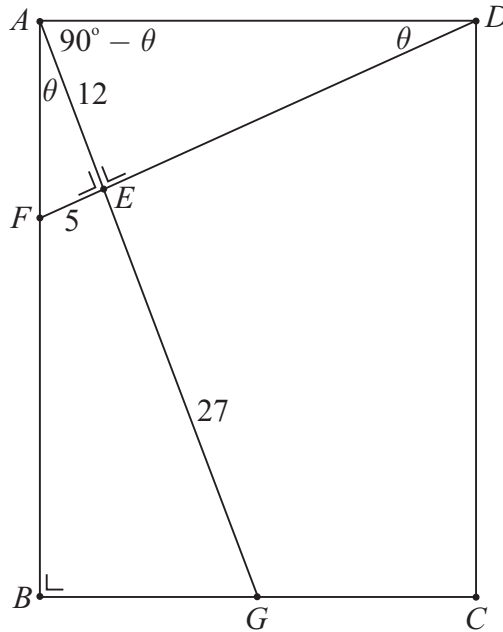
Consider $\triangle DAE$:

$$|\angle AED| = 90^\circ$$

$$|\angle EAD| = 90^\circ - \theta$$

$$\therefore |\angle ADE| = \theta$$

$\therefore \triangle AFE$ and $\triangle DAE$ are similar.



Question 5 (b)

$\triangle AFE$ and $\triangle DAE$ are similar: $\frac{|AD|}{|AF|} = \frac{|AE|}{|FE|}$

$$|AF|^2 = 12^2 + 5^2 = 144 + 25 = 169$$

$$|AF| = \sqrt{169} = 13 \text{ cm}$$

$$\therefore \frac{|AD|}{13} = \frac{12}{5} \Rightarrow |AD| = \frac{12 \times 13}{5} = 31.2 \text{ cm}$$

Question 5 (c)

Consider $\triangle AFE$:

$$|\angle AEF| = 90^\circ$$

Let $|\angle FAE| = \theta$

$$\therefore |\angle EFA| = 90^\circ - \theta$$

Consider $\triangle AGB$:

$$|\angle ABG| = 90^\circ$$

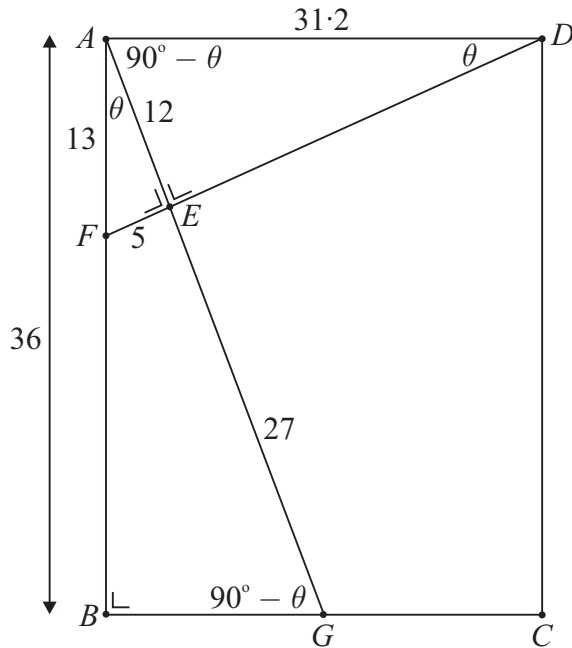
$$|\angle BAG| = \theta \text{ [Common angle]}$$

$$\therefore |\angle AGB| = 90^\circ - \theta$$

$\therefore \triangle AFE$ and $\triangle AGB$ are similar.

$$\frac{|AB|}{|AE|} = \frac{|AG|}{|AF|} \Rightarrow \frac{|AB|}{12} = \frac{12 + 27}{13}$$

$$\therefore |AB| = \frac{12 \times 39}{13} = 36 \text{ cm}$$



Question 5 (d)

Area of $GCDE = \text{Area } ABCD - \text{Area } \triangle AGB - \text{Area } \triangle DAE$

$$= |AD| \times |AB| - \frac{1}{2} \times |BG| \times |AB| - \frac{1}{2} \times |AE| \times |DE|$$

$$= 31.2 \times 36 - \frac{1}{2} \times \sqrt{39^2 - 36^2} \times 36 - \frac{1}{2} \times 12 \times \sqrt{31.2^2 - 12^2}$$

$$= 680.4 \text{ cm}^2$$