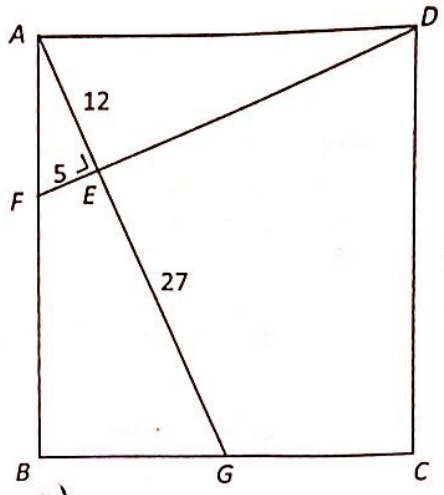
Question 5 **(25 marks)**

$ABCD$ is a rectangle.

$F \in [AB]$, $G \in [BC]$, $[FD] \cap [AG] = \{E\}$, and $FD \perp AG$.

$|AE| = 12$ cm, $|EG| = 27$ cm, and $|FE| = 5$ cm.



(a) Prove that ΔAFE and ΔDAE are similar (equiangular).

$|\angle AEF| = |\angle AED| = 90°$

$|\angle FAE| + |\angle EAD| = 90°$ (ABCD rectangle)

but $|\angle FAE| + |\angle AFE| = 90°$ (angles in Δ add to 180°)

$\therefore |\angle EAD| = |\angle AFE|$

And $|\angle FAE| = |\angle ADE|$ (angles in Δ add to 180°)

$\therefore$ equiangular.

(b) Find $|AD|$.

$|AF| = 13$

$\therefore \frac{|AD|}{12} = \frac{13}{5}$

$\therefore |AD| = \boxed{31.2}$ cm

(c) ΔAFE and ΔAGB are similar. Show that $|AB| = 36$ cm.

$\frac{|AB|}{39} = \frac{12}{13}$

$\therefore |AB| = 36$ cm

(d) Find the area of the quadrilateral $GCDE$.

Area = area ABCD − area Δ ABG − area Δ AED

$= (36)(31.2) - \frac{1}{2}(15)(36) - \frac{1}{2}(12)(28.8)$

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

SEC Set B 2017 P2