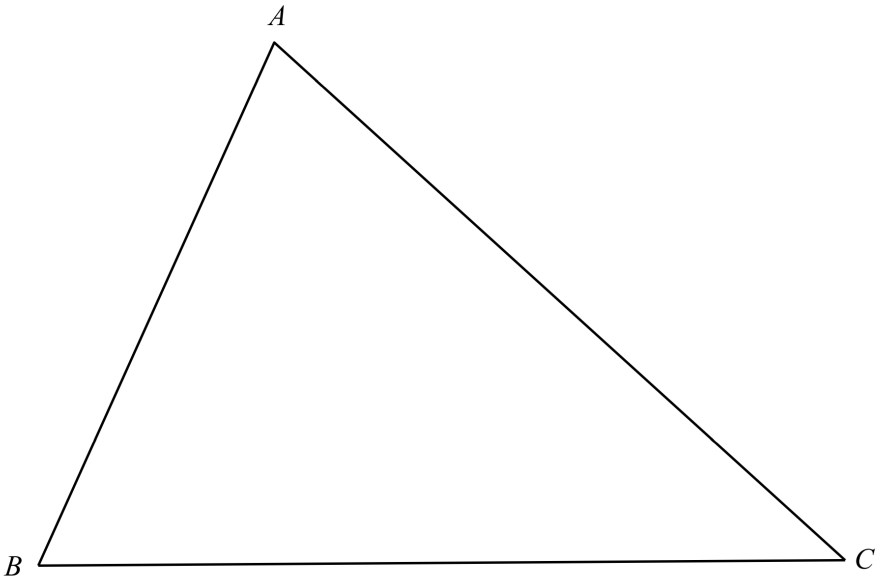
Question 6 **(25 marks)**

(a) Construct the centroid of the triangle ABC below. Show all construction lines.
(Where measurement is used, show all relevant measurements and calculations clearly.)

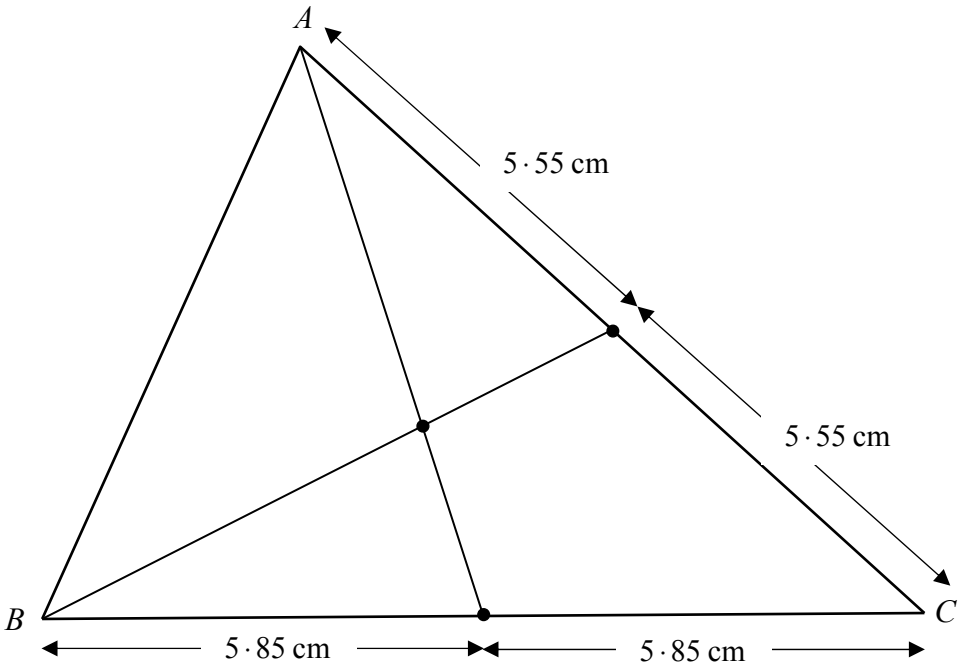


(b) Prove that, if three parallel lines cut off equal segments on some transversal line, then they will cut off equal segments on any other transversal line.

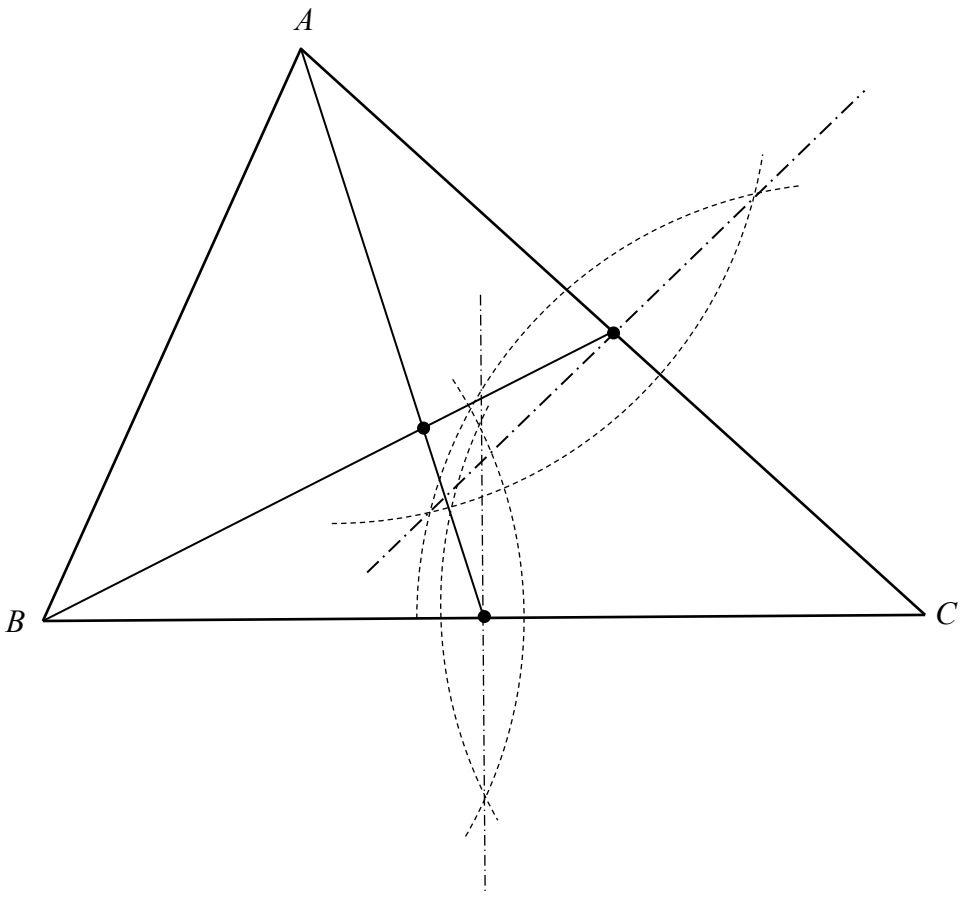
Question 6 **(25 marks)**

(a) Construct the centroid of the triangle ABC below. Show all construction lines.
(Where measurement is used, show all relevant measurements and calculations clearly.)

$|AC| = 11 \cdot 1$ cm; $|BC| = 11 \cdot 7$ cm



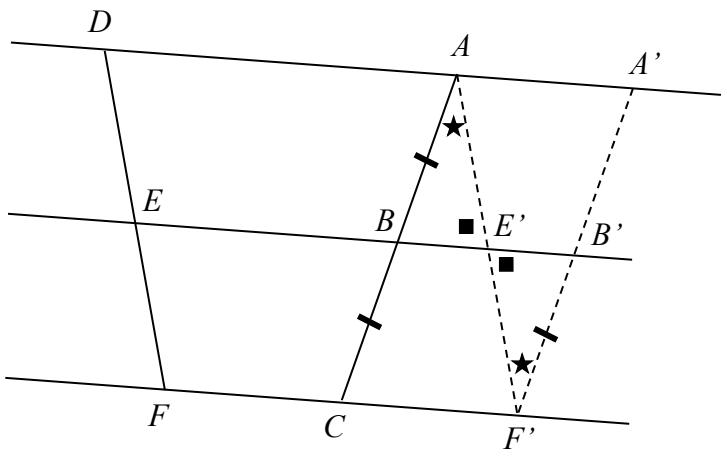
or



[41]

(b) Prove that, if three parallel lines cut off equal segments on some transversal line, then they will cut off equal segments on any other transversal line.

Diagram:



Given: $AD \parallel BE \parallel CF$, as in the diagram, with $|AB| = |BC|$

To Prove: $|DE| = |EF|$

Construction: Draw $AE' \parallel DE$, cutting EB at E' and CF at F'
Draw $F'B' \parallel AB$, cutting EB at B', as in diagram.

Proof:

$|B'F'| = |BC|$ (opposite sides in a parallelogram)
$= |AB|$ (by assumption)
$|\angle BAE'| = |\angle E'F'B'|$ (alternate angles)
$|\angle AE'B| = |\angle F'E'B'|$ (vertically opposite angles)
$\therefore \Delta ABE'$ is congruent to $\Delta F'B'E'$ (ASA)
$\therefore |AE'| = |F'E'|$
But $|AE'| = |DE|$ and $|F'E'| = |FE|$ (opposite sides in a parallelogram)
$\therefore |DE| = |EF|$

Question 6 **(25 marks)**

(a) **Scale 5C (0, 2, 4, 5)**
Low *Partial Credit:*
- Some relevant calculation
- One side bisected
- One midpoint indicated

High Partial Credit:
- One median drawn

(b) **Diagram / Given** : **Scale 5B (0, 2, 5)**
Partial Credit:
- Effort at *Diagram* or *Given*

Construction: **Scale 5B (0, 2, 5)**
Partial Credit:
- Construction attempted (diagram and/or description)

Proof: Scale 10C (0, 4, 8, 10)
Low Partial Credit:
- More than one critical step omitted but still some substantial work of merit

High Partial Credit:
- Proof completed with one critical step omitted