Construction

1. (a) **D** and **E** are points on the sides CA and CB respectively of a triangle ABC, right-angled at **C**.
   Prove that $AE^2 + BD^2 = AB^2 + DE^2$.

   (b) Diagonals of a trapezium $ABCD$ with $AB \parallel DC$ intersect each other at the point **O**. If $AB = 2CD$, find the ratio of the areas of triangles AOB and COD.

2. Answer any **four** of the following questions :

   (i) Given $\triangle ABC \sim \triangle PQR$. If $\frac{AB}{PQ} = \frac{1}{3}$,then $\frac{ar(\triangle ABC)}{ar(\triangle PQR)}$ is

   (A) $\frac{1}{3}$
   (B) 3
   (C) $\frac{2}{3}$
   (D) $\frac{1}{9}$

   (ii) The length of an altitude of an equilateral triangle of side 8 cm is

   (A) 4 cm
   (B) $4\sqrt{3}$ cm
   (C) $\frac{8}{3}$ cm
   (D) 12 cm

   (iii) In $\triangle PQR$, $PQ = 6\sqrt{3}$ cm, $PR = 12cm$ and $QR = 6$ cm. The measure of angle **Q** is

   (A) 120°
   (B) 60°
   (C) 90°
   (D) 40°

   (iv) If $\triangle ABC \sim \triangle PQR$ and $\angle B = 46°$and $\angle R = 69°$, then the measure of $\angle$A is

   (A) 65°
   (B) 111°
   (C) 44°
   (D) 115°

   (v) **P** and **Q** are the points on the sides AB and AC respectively of a $\triangle ABC$ such that $PQ \parallel BC$. If $AP : PB = 2 : 3$ and $AQ = 4$ cm,then AC is equal to

   (A) 6 cm
   (B) 8 cm
   (C) 10 cm
   (D) 12 cm

3. Answer any **four** of the following questions :

(i) ABC and BDE are two equilateral triangles such that **D** is the midpoint of BC. The ratio of the areas of the triangles ABC and BDE is

(A) 2:1
(B) 1:2
(C) 4:1
(D) 1:4

(ii) In $\triangle$ ABC , $AB = 4\sqrt{3}$ cm, $AC = 8$ cm and $BC = 4$ cm. The angle B is

(A) 120°
(B) 90°
(C) 60°
(D) 45°

(iii) The perimeters of two similar triangles are 35 cm and 21 cm respectively. If one side of the first triangle is 9 cm, then the corresponding side of the second triangle is

(A) $5 \cdot 4$ cm
(B) $4 \cdot 5$ cm
(C) $5 \cdot 6$ cm
(D) 15 cm

(iv) In a $\triangle ABC$, **D** and **E** are points on the sides AB and AC respectively such that $DE \parallel BC$ and $AD : DB = 3 : 1$. If $AE = 3 \cdot 3$ cm, then AC is equal to

(A) 4 cm
(B) $1 \cdot 1$ cm
(C) $4 \cdot 5$ cm
(D) $5 \cdot 5$ cm

(v) In an isosceles triangle ABC, if $AC = BC$ and $AB^2 = 2AC^2$, the $\angle$C is equal to

(A) 30°
(B) 45°
(C) 60°
(D) 90°

4. Write the steps of construction of drawing a line segment $AB = 4 \cdot 8$ cm and finding a point **P** on it such that $AP = \frac{1}{4}AB$.