1 Mark:

1. In Figure $MN \parallel AB$, $BC = 7.5 \text{ cm}$, $AM = 4 \text{ cm}$ and $MC = 2 \text{ cm}$. Find the length $BN$.

2. If Fig. $S$ and $T$ are points on the sides $PQ$ and $PR$, respectively of $\triangle PQR$, such that $PT = 2 \text{ cm}$, $TR = 4$ and $ST$ is parallel to $QR$. Find the ratio of the areas of $\triangle PST$ and $\triangle PQR$.

3. In Fig. $\triangle AHK$ is similar to $\triangle ABC$. If $AK = 10 \text{ cm}$, $BC = 3.5 \text{ cm}$ and $HK = 7 \text{ cm}$, find $AC$.

4. In $\triangle LMN$, $\angle L = 50^\circ$ and $\angle N = 60^\circ$. If $\triangle LMN \sim \triangle PQR$, then find $\angle Q$.

5. In a $\triangle ABC$, $DE \parallel BC$. If $DE = \frac{2}{3} BC$ and area of $\triangle ABC = 81 \text{ cm}^2$, find the area of $\triangle ADE$.

6. In Figure, $\angle M = \angle N = 46^\circ$. Express $x$ in terms of $a, b$ and $c$ where $a, b$ and $c$ are lengths of $LM$, $MN$ and $NK$ respectively.

7. In Figure, $PQ \parallel BC$ and $AP:PB = 1:2$. Find $\frac{\text{ar}(\triangle APQ)}{\text{ar}(\triangle ABC)}$.

8. In the given figure, $DE$ is parallel to $BC$ and $AD = 1 \text{ cm}$, $BD = 2 \text{ cm}$. What is the ratio of the area of $\triangle ABC$ to the area of $\triangle ADE$?
2 Marks:

1. In Figure, \( \triangle ABD \) is a right triangle, right-angled at \( A \) and \( AC \perp BD \).
   Prove that \( AB^2 = BC \cdot BD \).

\[ \text{CBSE 2009, Outside Delhi (30/1)} \]

2. \( E \) is a point on the side \( AD \) produced of a parallelogram \( ABCD \) and \( BE \) intersects \( CD \) at \( F \). Show that \( \triangle ABE \sim \triangle CFB \).
   \[ \text{CBSE 2008 (30/2/1), (30/2/2), (30/2/3)} \]

3. In the figure given below, \( DE \parallel BC \). If \( AD = 2.4 \text{ cm}, DB = 3.6 \text{ cm} \) and \( AC = 5 \text{ cm} \) Find \( AE \).

\[ \text{CBSE Sample Paper II 2008} \]

4. In the figure given below, \( AC \) is parallel to \( BD \),
   Is \( \frac{AE}{CE} = \frac{DE}{BE} \)? Justify your answer.

\[ \text{CBSE Sample Paper I 2008} \]

3 Marks:

1. In \( \triangle ABC \), right-angled at \( A, BL \) and \( CM \) are the two medians. Prove that \( 4(BL^2 + CM^2) = 5BC^2 \).

   \[ \text{CBSE 2010, Foreign (30/2/1)} \]

2. In Fig. \( ABC \) is a right triangle, right angled at \( C \) and \( D \) is the mid-point of \( BC \). Prove that \( AB^2 = 4AD^2 - 3AC^2 \).

   \[ \text{CBSE 2010, Delhi (30/1/1)} \]

3. In Figure, \( AD \perp BC \) and \( BD = \frac{1}{3} CD \). Prove that \( 2CA^2 = 2AB^2 + BC^2 \).

\[ \text{OR} \]

In Figure, \( M \) is mid-point of side \( CD \) of a parallelogram \( ABCD \). The line \( BM \) is drawn intersecting \( AC \) at \( L \) and \( AD \) produced at \( E \). Prove that \( EL = 2 BL \).

\[ \text{CBSE 2009, Outside Delhi (30/1)} \]
4. In Figure, $\triangle ABC$ is right angled at $B$. $D$ and $E$ trisect $BC$. Prove that $8 AE^2 = 3 AC^2 + 5 AD^2$.

![Diagram of right triangle with trisecting points](image)

CBSE 2009, Foreign (30/2/1)

5. In Figure, two triangles $ABC$ and $DBC$ lie on the same side of base $BC$. $P$ is a point on $BC$ such that $PQ \parallel BA$ and $PR \parallel BD$. Prove that $QR \parallel AD$.

![Diagram of parallel lines](image)

CBSE 2009, Foreign (30/2/1)

6. In Figure, $\triangle ABC$ is right angled at $C$ and $DE \perp AB$. Prove that $\triangle ABC \sim \triangle ADE$ and hence find the lengths of $AE$ and $DE$.

![Diagram of right triangle with altitude](image)

In Figure, $DEFG$ is a square and $\angle BAC = 90^\circ$. Show that $DE^2 = BD \times EC$.

CBSE 2009, Delhi (30/1/1)

7. In Fig., $AD \perp BC$. Prove that $AB^2 + CD^2 = BD^2 + AC^2$.

![Diagram of right triangle with altitude](image)

CBSE 2008 (30/2/1), (30/2/2), (30/2/3)

8. In Fig., $\frac{XP}{PY} = \frac{XQ}{QZ} = 3$, if the area of $XYZ$ is $32 \text{ cm}^2$, then find the area of the quadrilateral $PYZQ$.

![Diagram of triangle with ratio](image)

CBSE Sample Paper III 2008

9. In the figure, $ABC$ and $AMP$ are right angled at $B$ and $M$ respectively. Prove that $CA \times MP = PA \times BC$.

![Diagram of right triangles](image)

CBSE Sample Paper III 2008
1. If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, prove that the other two sides are divided in the same ratio.

Using the above, do the following:
In Figure $PQ \parallel AB$ and $AQ \parallel CB$. Prove that $AR^2 = PR \cdot CR$.

2. Prove that the ratio of the areas of two similar triangles is equal to the ratio of the squares of their corresponding sides.
The area of the equilateral triangle described on the side of a square is half the area of the equilateral triangle described on its diagonal.

3. Prove that, if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio.
Using the above result, do the following:
In Figure, $DE \parallel BC$ and $BD = CE$. Prove that $\triangle ABC$ is an isosceles triangle.

4. If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, prove that the other two sides are divided in the same ratio.
Using the above, prove the following:
In Fig., $AB \parallel DE$ and $BC \parallel EF$. Prove that $AC \parallel DF$.

5. Prove that the ratio of areas of two similar triangles is equal to the square of the ratio of their corresponding sides.
Use the above theorem, in the following:
The areas of two similar triangles are $81 \text{ cm}^2$ and $144 \text{ cm}^2$. If the largest side of the smaller triangle is $27 \text{ cm}$, find the largest side of the larger triangle.

6. Prove that in a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.
Use the above theorem, in the following.
If $ABC$ is an equilateral triangle with $AD \perp BC$, then $AD^2 = 3 \cdot DC^2$. 