

Board – CBSE

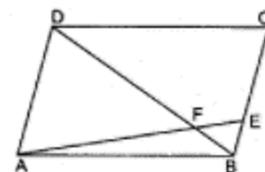
Class – 10th

Topic – Triangles

1. From airport two airplanes start at the same time. If the speed of first airplane due North is 500 km/h and that of other due East is 650 km/h, then find the distance between two airplanes after 2 hours.

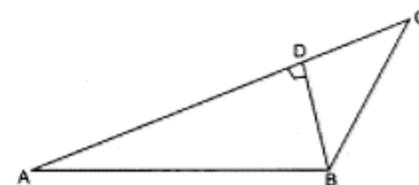
Ans.  $100\sqrt{269}Km$

2. In the figure, ABCD is a parallelogram and E divides BC in the ratio 1: 3. DB and AE intersect at F. Show that  $DF = 4FB$  and  $AF = 4FE$



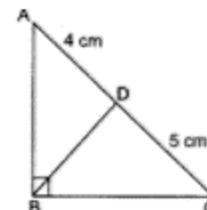
3. State and prove Converse of Pythagoras Theorem.

4.



In the figure, ABC is a triangle and  $BD \perp AC$ . Prove that  $AB^2 + CD^2 = AD^2 + BC^2$

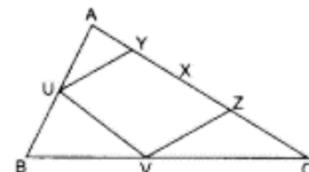
5. If in a right angle  $\triangle ABC$ , right angled at A,  $AD \perp BC$ , then prove that  $AB^2 + CD^2 = BD^2 + AC^2$
6. Prove that the ratio of the areas of two similar triangles is equal to the ratio of squares of their corresponding sides.
7. Prove that if a line is drawn parallel to one side of a triangle to intersect the other two sides at distinct points, then other two sides are divided in the same ratio.
8. In the given figure, ABC is a triangle, right angled at B and  $BD \perp AC$ . If  $AD = 4$  cm and  $CD = 5$  cm, find AB.



Ans. 6 cm

9. Prove that the sum of square of the sides of a rhombus is equal to the sum of squares of its diagonals.

10. In  $\triangle ABC$ , X is any point on AC. If Y, Z, U and V are the middle points of AX, XC, AB and BC respectively, then prove that  $UY \parallel VZ$  and  $UV \parallel YZ$



11. Prove that the ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides.

Using the above, prove the following

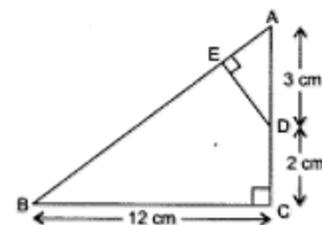
If the areas of two similar triangles are equal, then prove that the triangles are congruent.

12. In a triangle, if the square of one side is equal to the sum of the squares of the other two sides, then prove that the angle opposite the first side is a right angle.

Using the above, do the following:

In an isosceles triangle PQR,  $PQ = QR$  and  $PR^2 = 2PQ^2$ . Prove that  $\angle Q$  is a right angle.

13. 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.

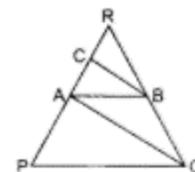


14. If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, prove that the other two sides are divided in the same ratio.

Using the above, do the following:

In figure,  $PQ \parallel AB$  and  $AQ \parallel CB$ .

Prove that  $AR^2 = PR \cdot CR$ .



15. Prove that in a right angle triangle the square on the hypotenuse is equal to the sum of the squares on the other two sides.

Using the above, do the following:

Prove that in a  $\Delta ABC$ , if  $AD$  is perpendicular to  $BC$ , then  $AB^2 + CD^2 = AC^2 + BD^2$ .

16. 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  $\Delta ABC$  is an isosceles triangle.

17. Prove that the ratio of areas of two similar triangles is equal to the ratio of the squares of their corresponding sides. Using the above, prove the following: The areas of the equilateral triangle described on the side of a square are half the area of the equilateral triangle described, on its diagonal.

18.  $ABC$  is an isosceles triangle in which  $AC = BC$ . If  $AB^2 = 2AC^2$  then, prove that  $\Delta ABC$  is right triangle.

19. In  $\Delta ABC$ , from  $A$  and  $B$  altitudes  $AD$  and  $BE$  are drawn. Prove that  $\Delta ADC \sim \Delta BEC$ . Is  $\Delta ADB \sim \Delta AEB$  and  $\Delta ADB \sim \Delta ADC$ ?

20.  $ABC$  is a right triangle, right-angled at  $B$ .  $D$  and  $E$  trisect  $BC$ , prove that  $8AE^2 = 3AC^2 + 5AD^2$

21. Prove that in a triangle, if the square of one side is equal to the sum of the squares of the other two sides, then the angle opposite the first side is a right angle.

22. If in two triangles, corresponding angles are equal, then the two triangles are.....

**Ans. Equiangular then similar**

23.  $ABC$  is a triangle with  $DE \parallel BC$ . If  $AD=2\text{cm}$ ,  $BD=4\text{cm}$  then find the value  $DE:BC$

**Ans. 1:3**

24. The perimeters of two similar triangles are  $40\text{cm}$  and  $50\text{cm}$  respectively, find the ratio of the area of the first triangle to the area of the 2nd triangle:

**Ans. 16:25**

25. A man goes 150m due east and then 200m due north. How far is he from the starting point?

**Ans. 250 m**

26. A ladder reaches a window which is 12m above the ground on one side of the street. Keeping its foot at the same point, the ladder is turned to the other side of the street to reach a window 9m high. If the length of the ladder is 15m, find the width of the street.

**Ans. 21m**

27. Two isosceles triangles have equal angles and their areas are in the ratio 16:25, then find the ratio of their corresponding heights

**Ans. 4:5**

28. Two poles of heights 6m and 11m stand vertically upright on a plane ground. If the distance between their feet is 12m, then find the distance between their tops

**Ans. 13m**

29. The lengths of the diagonals of a rhombus are 16cm and 12cm. Then, find the length of the side of the rhombus.

**Ans. 10cm**