



## MATHS

### BOOKS - RS AGGARWAL MATHS (HINGLISH)

#### PROPERTIES OF TRIANGLES

##### Example

1. In a  $\triangle ABC$ ,  $\angle A = 35^\circ$  and  $\angle B = 65^\circ$ , find the measure of  $\angle C$

A.  $80^\circ$

B.  $120^\circ$

C.  $155^\circ$

D.  $140^\circ$

**Answer: A**



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2. Find the angle of a triangle which are in the ratio 3: 4: 5.

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3. Two angles of a triangle are equal and the third angle measure  $70^\circ$  Find the measure of each of the unknown angles.

A.  $55^\circ$

B.  $45^\circ$

C.  $35^\circ$

D.  $110^\circ$

**Answer: A**

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4. In a  $\triangle ABC$  if  $3\angle A = 4\angle B = 6\angle C$ , calculate  $\angle A$

A.  $\angle A = 60^\circ$

B.  $\angle A = 80^\circ$

C.  $\angle A = 40^\circ$

D. None of these

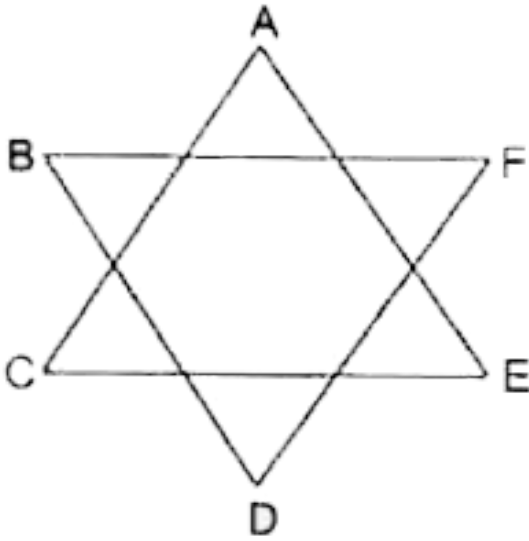
**Answer: B**



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5. The adjoining figure has been obtained by using two triangles .then

$$\angle A + \angle B + \angle C + \angle D + \angle E + \angle F = ?$$



A.  $180^\circ$

B.  $270^\circ$

C.  $360^\circ$

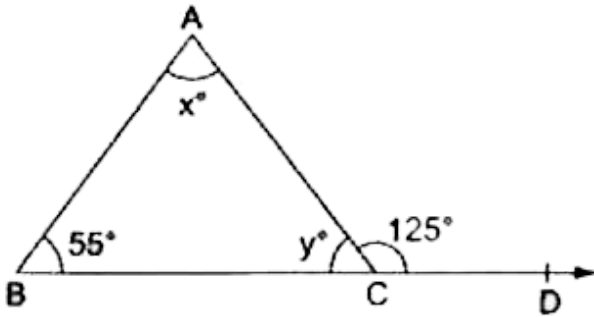
D.  $720^\circ$

**Answer: C**



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6. In the given figure find the values of  $x$  and  $y$ .



A.  $x=70$  and  $y=65$

B.  $x=70$  and  $y=55$

C.  $x=55$  and  $y=70$

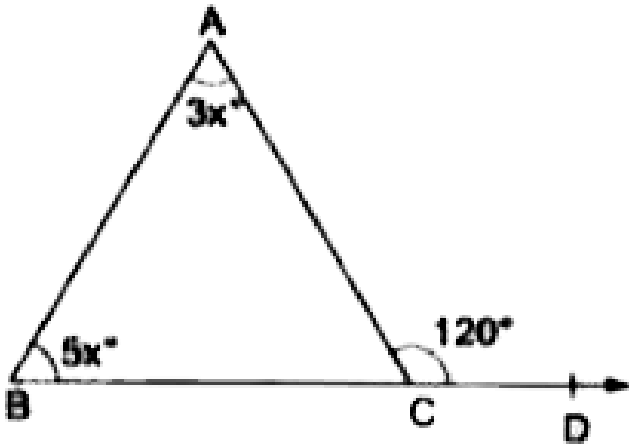
D.  $x=80$  and  $y=55$

**Answer: B**

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7. one side of a triangle is produced and the exterior angle so formed is  $120^\circ$ . if the interior opposite angles be in the ratio 3 : 5. find the measure

of each angles of triangle .



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8. If the sides of a triangle are produced in an order, show that the sum of the exterior angles so formed is  $360^\circ$ .

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9. Is it possible to draw a triangle the length of whose sides are 3cm 4cm and 5cm?

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10. Is it possible a triangle whose sides have length 10.3 cm ,5.8cm and 4.6 cm?

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11. Is it possible to draw a triangle whose sides are 5cm 7cm and 12cm?

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12. Three points A,B,C are collinear they lie on the shown in the figure.can you draw  $\triangle ABC$ ?if not why .



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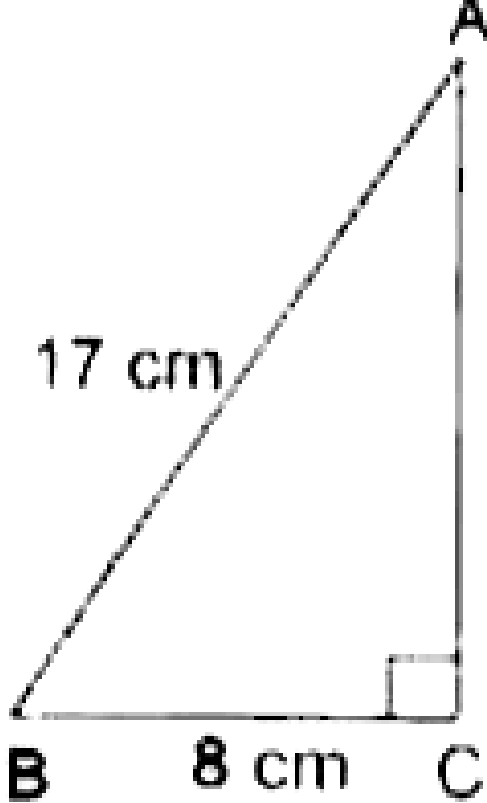
13. Two sides of a triangle are 6cm and 8cm long. What can be the length of its third side ?



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14. The hypotenuse of a right triangle is 17cm long .if one of the remaining two sides is 8 cm in length .find the length of the other side.





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15. The length of the sides of two triangle are given below. Which of them is right angles?

$a=7\text{cm}, b=24\text{cm}, c=25\text{cm}$

$a=8\text{cm}, b=5\text{cm}, c=10\text{cm}$

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16. A 15m long ladder is placed against a wall in such way that the foot of the ladder is 9m away from the wall. Up to what height does the ladder reach the wall?



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17. A ladder 17m long reaches a window which is 8m 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 at a height of 15m. Find the width of the street.



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18. A man goes 24 m due east and then 10m due north. How far is he away from his initial position?

A. 26 m

B. 25 m

C. 20 m

D. 15 m

**Answer: A**



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**19.** Two poles of height 9m and 14 m stand upright on a plane ground. if the distance between their feet is 12m. find the distance between their tops.



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**20.** A tree is broken at a height of 6 m from the ground and its top touches the ground at a distance of 8m from the tree. Find the original height of the tree.

A. 6 m

B. 16 m

C. 10 m

D. 14 m

**Answer: B**

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### Exercise 15 A

1. In a  $\triangle ABC$  if  $\angle A = 72^\circ$  and  $\angle B = 63^\circ$ , find  $\angle C$

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2. In a  $\triangle DEF$ , if  $\angle E = 105^\circ$  and  $\angle F = 40^\circ$ , find  $\angle D$

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3. In a  $\triangle XYZ$ , if  $\angle X = 90^\circ$  and  $\angle Z = 48^\circ$ , find  $\angle Y$ .



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4. Find the angle of a triangle which are in the ratio 4:3:2



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5. One of the acute angles of a right triangle is  $36^\circ$ , find the other`

A.  $54^\circ$

B.  $50^\circ$

C.  $60^\circ$

D.  $65^\circ$

Answer: A



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6. The acute angle of right triangle are in the ratio 2: 1 .Find each of these angles.

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7. One of a triangles is  $100^\circ$  and the other two angles are equal.Find each of the equal angles.

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8. Each of the two equal angles of a triangle is twice the third angle. Find the angles of the triangle.

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9. If one angle of a triangle is equal to the sum of the other two,show that the traingle is right angled.

Hint.  $\angle A = \angle B + \angle C \Rightarrow \angle A + \angle B + \angle C = 180^\circ$



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10. In a  $\triangle ABC$ , if  $2\angle A = 3\angle B = 6\angle C$  calculate  $\angle A$ ,  $\angle B$  and  $\angle C$



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11. Find the measure of each angle of an equilateral triangle.

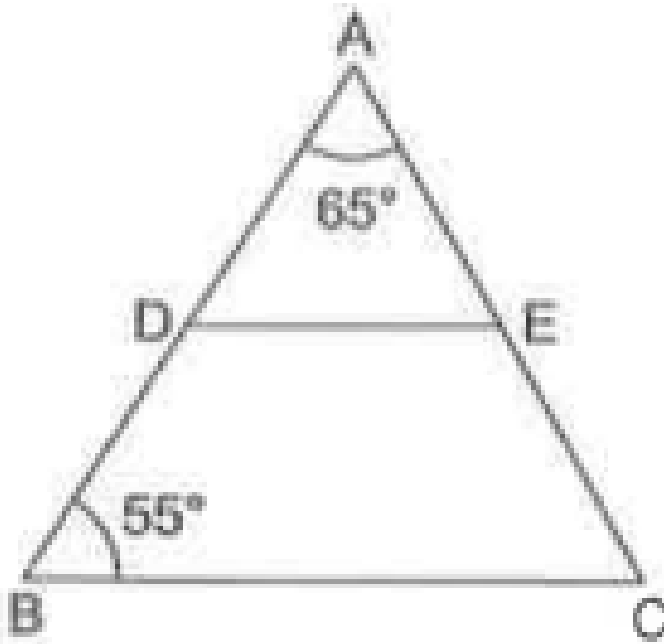


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12. In the given figure,  $DE \parallel BC$ . If  $\angle A = 65^\circ$  and  $\angle B = 55^\circ$  find.

$\angle ADE$

$\angle AED$



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13. Can a triangle have

two right angles?

two obtuse angles?

two acute angles?

all angles more than  $60^\circ$



all angles less than  $60^\circ$  ?

all angles to  $60^\circ$  ?

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**14.** Can a triangle following in Yes or 'NO'

Can an isosceles triangle be a right angle?

Can a right triangles be scalene triangle?

Can a right triangle be an equilateral triangle?

Can an obtuse triangle be an isosceles triangle?

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**15.** Fill in the blanks:

A right triangle cannot have an .....angle.

The acute angles of triangle triangle are....

Each acute angle of an isosceles right angle measure....

Each angle of an equilateral triangle measure.

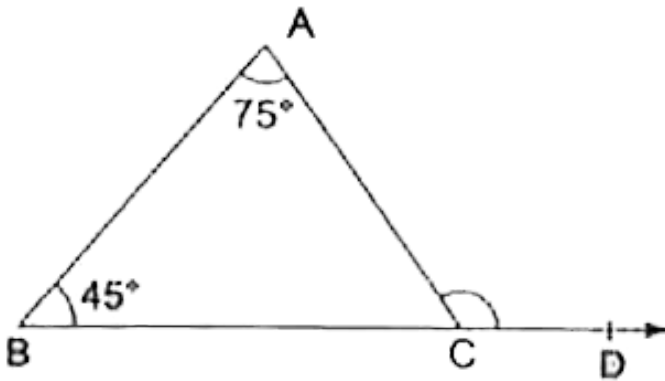
The side opposite the right angle of a right triangle is called....

The sum of the lengths of the sides of a triangle is called its....

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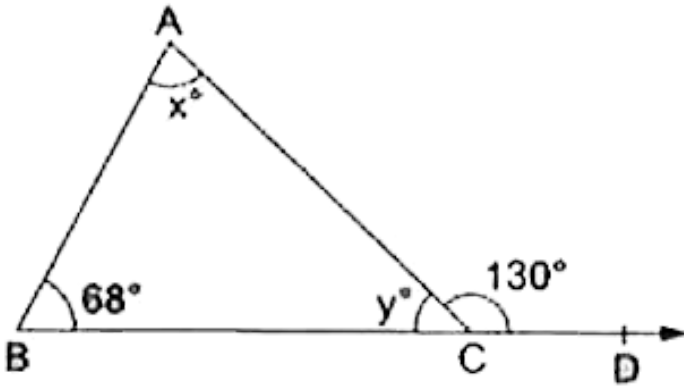
### Exercise 15 B

1. In the figure given alongside, Find the measure of  $\angle ACD$



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2. In the figure given along side ,find the values of  $x$  and  $y$ .



A.  $x = 62^\circ, y = 50^\circ$

B.  $x = 50^\circ, y = 50^\circ$

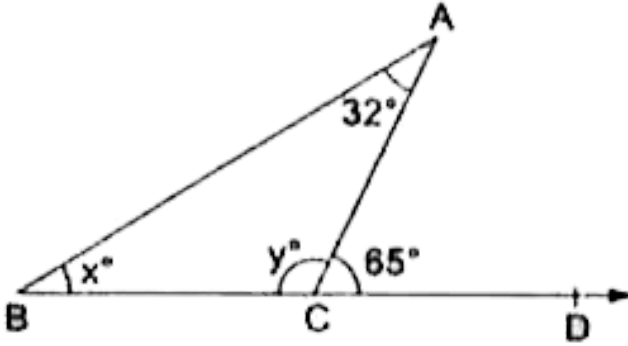
C.  $x = 50^\circ, y = 62^\circ$

D. None of these

**Answer: A**

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3. In the figure given alongside, find the values of  $x$  and  $y$ .



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4. An exterior angle of a triangle measure  $110^\circ$  and its interior opposite angles are in the ratio  $2:3$ . Find the angles of the triangle.

- A.  $40^\circ$  and  $70^\circ$
- B.  $44^\circ$  and  $66^\circ$
- C.  $50^\circ$  and  $60^\circ$
- D. none of these

**Answer: B**



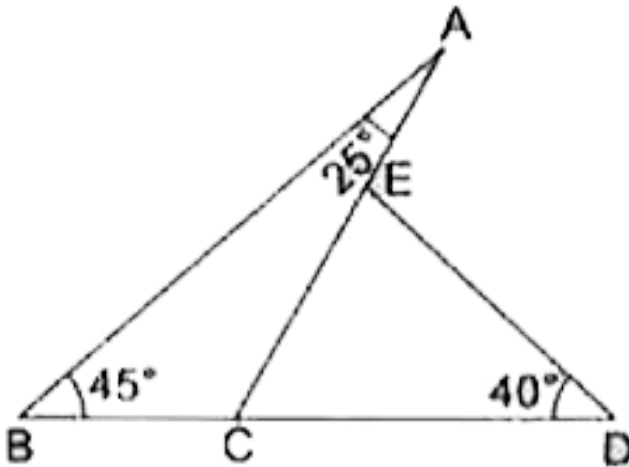
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5. An exterior angle of is  $100^\circ$  and its interior opposite angles are equal to each other. Find the measure of each angle of the triangle .



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6. In the figure along side , Find:



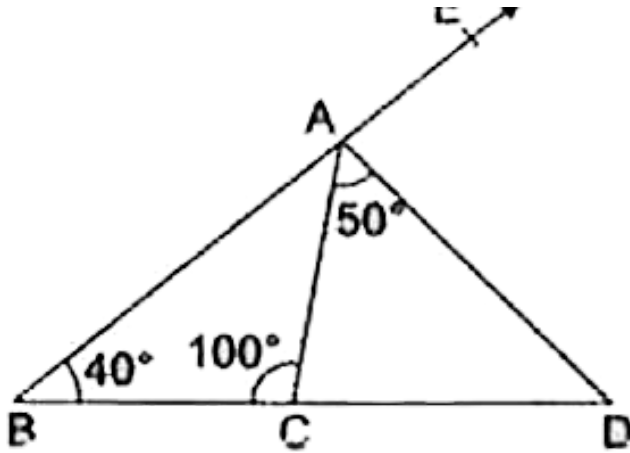
$\angle ACD$

$\angle AED$



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7. In the figure alongside, Find:



$\angle ACD$

$\angle ADC$

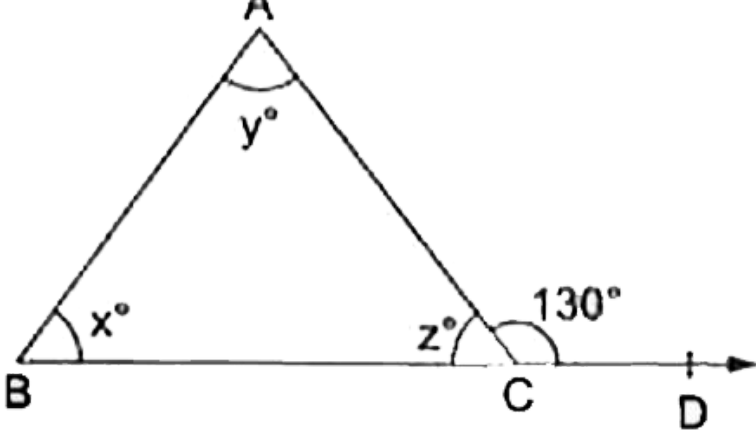
$\angle DAE$



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8. In the figure given alongside,  $x : y = 2 : 3$  and  $\angle ACD = 130^\circ$ .

Find the values of  $x$ ,  $y$  and  $z$ .



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### Exercise 15 C

1. Is it possible to draw a triangle, the length of whose sides are given below?

1cm, 1cm, 1cm

2cm, 3cm, 4cm

7cm, 8 cm, 15 cm

3.4 cm, 2.1 cm, 5.3 cm

6 cm, 7cm, 14cm

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2. Two sides of triangle are 5 cm and 9 cm long. What can be the length of its third side?

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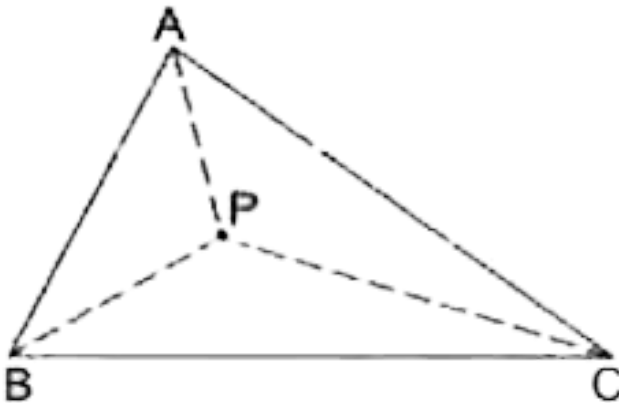
3. If P is a point in the interior of  $\triangle ABC$  then fill in the blanks with

> or < or =

PA+PB.....AB

PB+PC.....BC

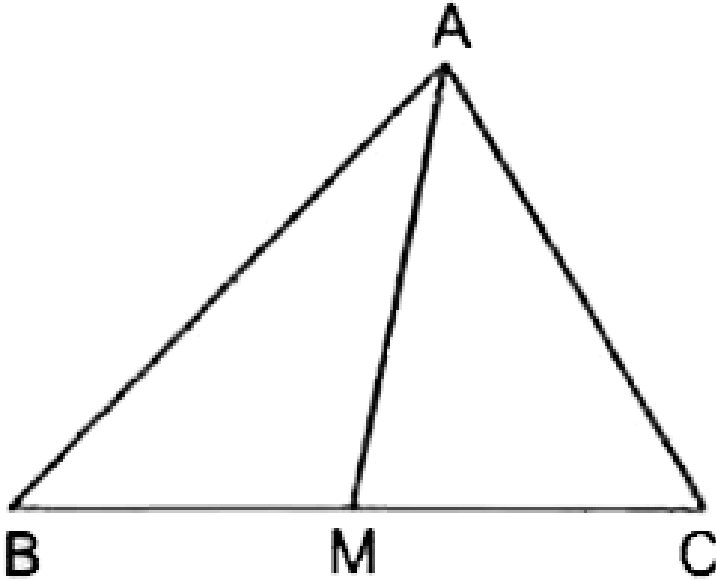
AC.....PA+PC



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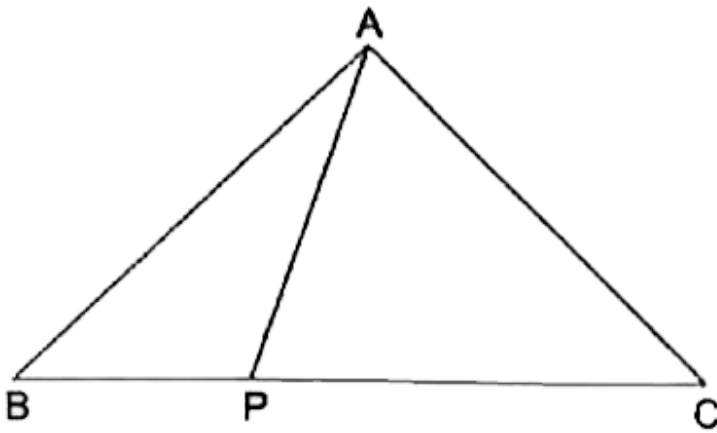


4. AM is median of  $\triangle ABC$ , prove that  $(AB+BC+CA) > 2AM$ .



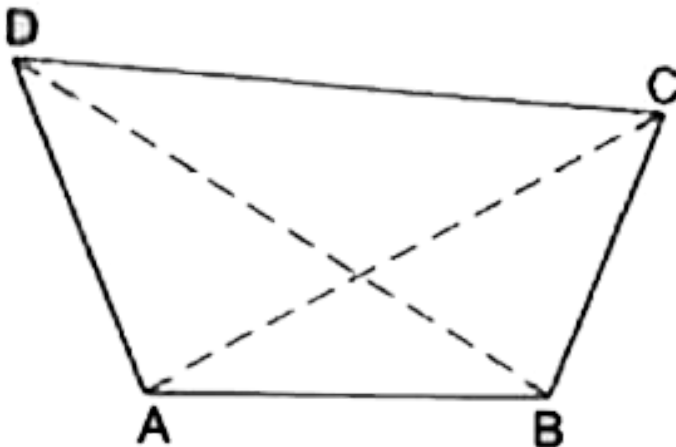
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5. In the given figure ,P is a point on the side BC of  $\triangle ABC$ . Prove that  $(AB + BC + AC) > 2AP$



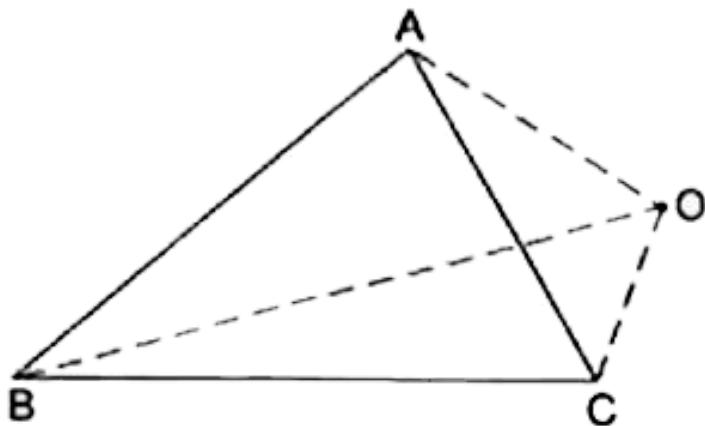
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6. ABCD is a quadrilateral prove that  
 $(AB + BC + CD + DA) > (AC + BD)$



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7. If  $O$  is point in the exterior of  $\triangle ABC$ , show that  $2(OA + OB + OC) > (AB + BC + CA)$



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### Exercise 15 D

1. Find the length of the hypotenuse of a right triangle, the other two sides of which measure 9 cm and 12 cm

A. 16cm

B. 15cm

C. 17cm

D. 18cm

**Answer: B**

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2. The hypotenuse of a right triangle is 26cm long. If one of the remaining two sides is 10 cm .Find the length of its third side.

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3. The length of one side of a right triangle 4.5 cm and the length of its hypotenuse is 7.5 cm .Find the length of its third side.

Hint :Let the third side be x then

$$X^2 = (7.5)^2 - (4.5)^2 = (7.5 + 4.5)(7.5 - 4.5) = (12 \times 3) = 36 = (6)^2$$



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4. The two legs of a right triangle are equal and the square of its hypotenuse is 50 .Find the length of each leg.



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5. The sides of a triangle measure 15 cm ,36cm and 39cm Show that it is a right angled triangle.

Hint

$$. (39)^2 - (36)^2 = (39 + 36)(39 - 36) = (75 \times 3) = (5 \times 3 \times 3) = (5 \times x$$



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6. In right  $\triangle ABC$  the lengths of its legs are given as  $a=6\text{cm}$  and  $b=4.5\text{cm}$  .Find the length of its hypotenuse.



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7. The length of the sides of some triangles are given below. Which of them are right angled?

a=15cm, b=20 cm and c=25 cm

a=9 cm, b=12 cm and c=16 cm

a=10 cm, b=24 cm and c=26cm



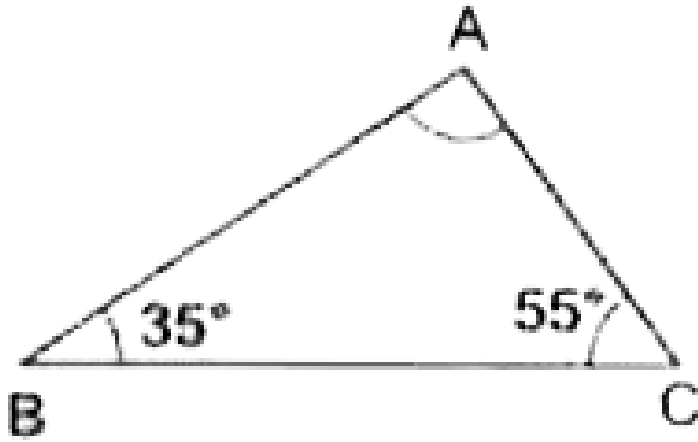
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8. In a  $\triangle ABC$ ,  $\angle B = 35^\circ$  and  $\angle C = 55^\circ$ . Write which of the following is true

$$AC^2 = AB^2 + BC^2$$

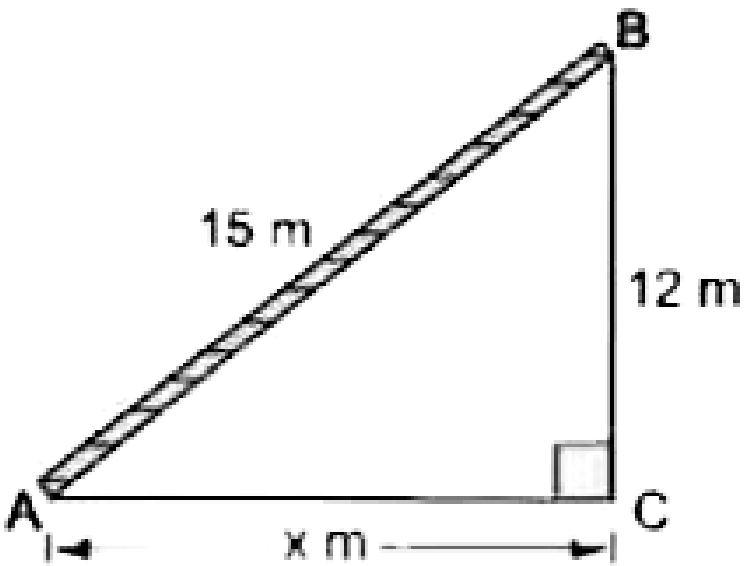
$$AB^2 = BC^2 + AC^2$$

$$BC^2 = AB^2 + AC^2$$



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9. A 15-m long ladder is placed against a wall to reach a window 12 m high. Find the distance of the ladder from the wall.



- A. 9 m
- B. 10 m
- C. 11 m
- D. 12 m

**Answer: A**

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10. A 5-m long ladder when set against the wall of a house reaches a height of 4.8 cm. How far is the foot of the ladder from the wall?



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11. एक पेड़ भूमि से 5m की ऊंचाई पर टूट जाता है और उसका ऊपरी सूरा भूमि को उसके आधार से 12m की दूरी पर छूता है। पेड़ की पूरी ऊंचाई ज्ञात कीजिए।



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12. Two poles 18m and 13 m high stand upright in a playground. If their feet are 12 m apart. Find the distance between their tops.



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13. A man goes 35m due west and then 12 m due north. How far is he from the starting point?





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14. A man goes 3 km due north and then 4 km due east. How far is away from his initial position?



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15. Find the length of diagonal of the rectangle whose sides are 16 cm and 12 cm.



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16. Find the perimeter of the rectangle whose length is 40 cm and diagonal is 41 cm.



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17. Find the perimeter of a rhombus ,the lengths of whose diagonal are 16cm and 30 cm.



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18. Fill in the blanks:

In a right triangle,the square of the hypotenuse is equal to the .....of the squares of the other two sides.

If the square of the one side of a triangle is equal to the sum of the square of the other two sides then the triangle is.....

Of all the lines segments that can be drawn to a given line from a given point outside it.the .....is the shortest.



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