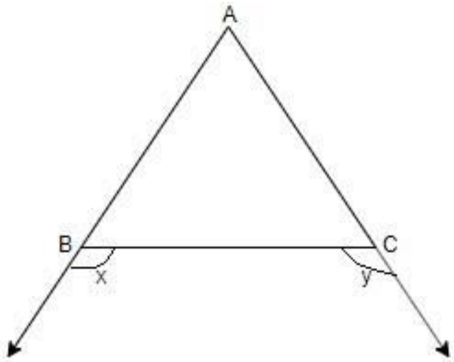
CBSE Test Paper 04
CH-7 Triangles

1. Two sides of a triangle are of lengths 5 cm and 1.5 cm. The length of the third side of the triangle cannot be
   a. 3.8 cm
   b. 3.6 cm
   c. 4 cm
   d. 3.4 cm
2. D is a point on the side BC of a $\triangle ABC$ such that AD bisects $\angle BAC$ then:
   a. BD = CD
   b. BA >BD
   c. CD>CA
   d. BD>BA
3. The length of two sides of a triangle are 7 units and 10 units. Which of the following length can be the length of the third side?
   a. 3 cm
   b. 19 cm
   c. 17 cm
   d. 13 cm
4. In the given figure, ABC is an equilateral triangle. The value of x + y is



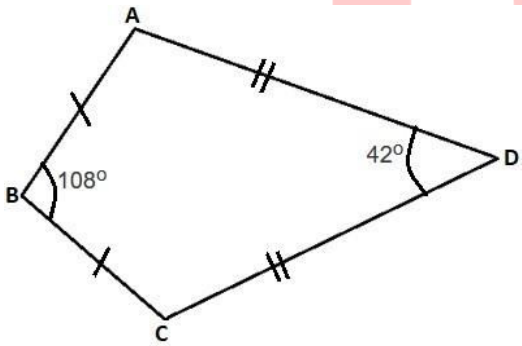
a. 200°

b. 240°

c. 120°

d. 180°

5. In figure, ABCD is a quadrilateral in which AB = BC and AD = DC. The measure of $\angle BCD$ is:



a. 30^o

b. 105^o

c. 150^o

d. 72^o

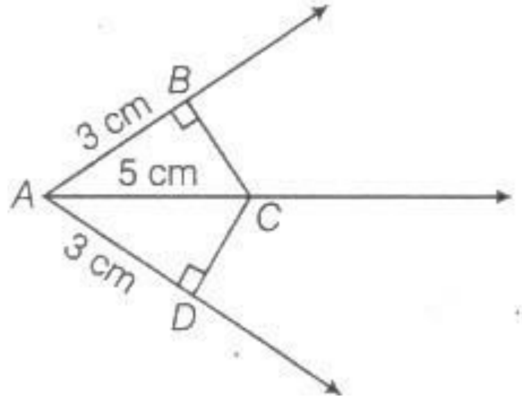
6. Fill in the blanks:

A triangle is an________triangle if and only if any two altitudes are equal.

7. Fill in the blanks:

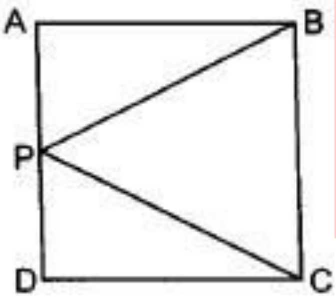
In $\triangle ABC$, if BC = AB and $\angle B = 80^o$, then $\angle A$ is equal to________.

8. In the given figure, if AC is bisector of $\triangle$BAD, such that AD = AB =3 cm and AC =5 cm. Show that $\triangle$ABC $\cong \triangle$ ADC and BC = CD.

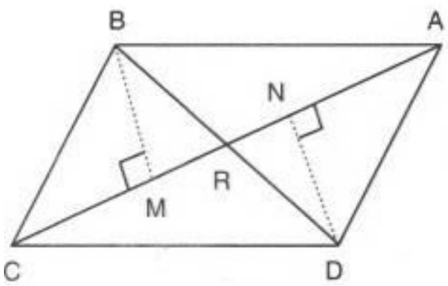


9. In a $\triangle$ABC, if $\angle A = 55^o$, $\angle B = 40^o$, find $\angle C$.

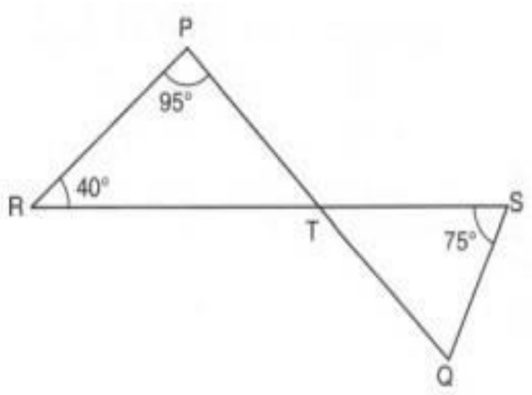
10. In given figure, ABCD is a square and P is the midpoint of AD. BP and CP are joined. Prove that $\angle$PCB = $\angle$PBC.



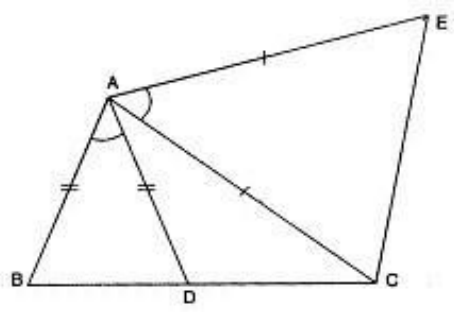
11. In Fig., BM and DN are both perpendiculars to the segments AC and BM = DN. Prove that AC bisects BD.



12. In a given figure, if lines PQ and RS intersect at a point T such that $\angle PRT = 40^o$, $\angle RPT = 95^o$ and $\angle TSQ = 75^o$, find $\angle$SQT.



13. In figure, AC = AE, AB = AD and $\angle$BAD = $\angle$EAC. Prove that BC = DE.



14. If D is any point on the base BC produced, of an isosceles triangle ABC, prove that AD > AB.

15. ABC is a right angled triangle, right angled at A & with AB = AC. Bisector of $\angle$ A meets BC at D. Prove that BC = 2 AD.

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Solution

1. (d) 3.4 cm

   Explanation: Given that: Two sides of triangle are 5 cm and 1.5 cm. We know that the sum of two sides of the triangle is always greater than the third side. Hence, 3.4 cm cannot be the third side. If it is the third side the sum of 3.4 cm and 1.5 cm will be smaller than 5 cm, so, the triangle will not be possible.
2. (b) BA >BD

   Explanation: Since, $\angle BAC$ is bisected by AD, then $\angle BAD$ is less than $\angle ABC$,hence the side opposite $\angle ABC$, i.e. BA is greater than the side opposite to $\angle BAD$ i.e.BD
3. (d) 13 cm

   Explanation: As per the rule in a triangle, sum of any 2 sides should be greater than the third side. So, the lenght of the third side should be 13, Since with 7,10 and 13 we have 7+10>13,7+13>10 and 13+10>7
4. (b) 240°

   Explanation:

   As triangle ABC is an equilateral traingle, therefore all the three angles are equal, that is , 60^o each.

   x = 180 - 60 = 120^o

   y = 180 - 60 = 120^o

   x + y = 120 + 120 = 240
5. (b) 105^o

   Explanation:

   Join AC. We get two isosceles triangles,Δ ABC and Δ ACD

   In Δ ABC,$\angle$ABC= 108^o

   $\therefore \angle BAC = \angle BCA = (180^o - 108^o) / 2 = \frac{72^\circ}{2} = 36^o$

   In Δ ACD, $\angle$ADC= 42^o

   $\therefore \angle DAC = \angle DCA = (180^o - 42^o) / 2 = 138^o/2 = 69^o$

Now, ∠ BCD = ∠BCA + ∠DCA = $36^o + 69^o = 105^o$

6. isosceles

7. 50^o

8. In △ABC and △ADC,

∠ABC = ∠ADC [each 90°]

AB = AD [given]

and AC = AC [common side]

∴ △ABC ≅ △ADC [by RHS congruence rule]

Then, BC = DC [byCPCT]

Hence proved.

9. In the △ABC given that ∠A = 55^o, ∠B = 40^o

∠A + ∠B + ∠C = 180^o (By angles sum property for triangle)

⇒ $55^o + 40^o$ + ∠C = 180^o

⇒ ∠C = $180^o - 55^o - 40^o$

⇒ ∠C = $180^o - 95^o$

∴ ∠C = 85^o

10. Given P is midpoint of AD

∴ PA = PD

AB = CD (sides of square ABCD)

∠PAB = ∠PDC = 90°

Hence by RHS congruency criteria,

△PAB ≅ △PDC

⇒ $PC = PB$ [CSCT]

∴ ∠PCB = ∠PBC (Angles opposite to equal sides are equal) Hence, proved

11. In △s BMR and DNR, we have

∠BMR = ∠DNR [Each equal to 90^o ∵ BM ⊥ AC and DN ⊥ AC]

∠BRM = ∠DRN [Vertically opposite angles]

and, BM = DN [Given]

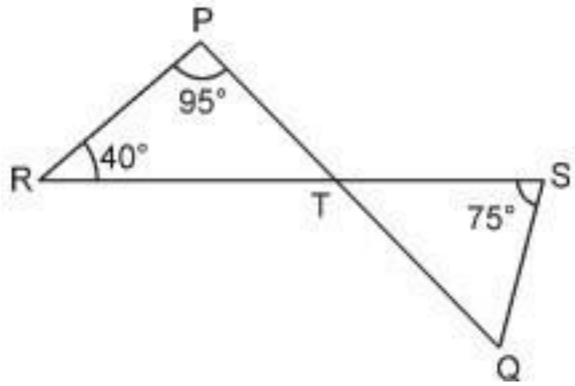
So, by AAS criterion of congruence, we obtain

$\triangle$BMR $\cong$ $\triangle$DNR

$\Rightarrow$ BR = DR [$\because$ Corresponding parts of congruent triangles are equal]

$\Rightarrow$ R is the mid-point of BD.

Hence, AC bisects BD.

12. 

In $\triangle$PRT we have

$\angle$P + $\angle$R + $\angle$PTR = 180° [By angle sum property for triangles]

$\Rightarrow$ 95° + 40° + $\angle$PTR = 180°

$\Rightarrow$ $\angle$PTR = 180° - 95° - 40°

$\Rightarrow$ $\angle$PTR = 45°

$\Rightarrow$ $\angle$QTS = 45° [$\because$ $\angle$QTS = $\angle$ PTR ,vertically opposite angles]

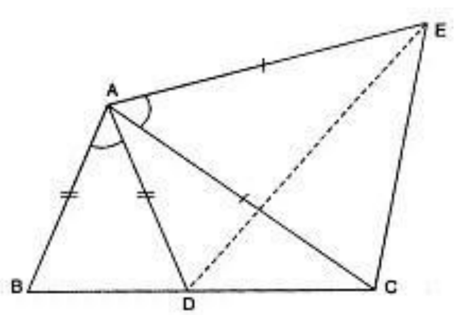
In $\triangle$SQT, we have

$\angle$QTS + $\angle$SQT + $\angle$TSQ = 180° [By angle sum proporty for triangles]

$\Rightarrow$ 45° + $\angle$SQT + 75° = 180°

$\Rightarrow$ $\angle$SQT = 180° - 120°

$\Rightarrow$ $\angle$SQT = 60°

13. 

Join DE

In DABC and D ADE,

AB = AD, AC = AE and $\angle$BAD = $\angle$EAC ...[Given]

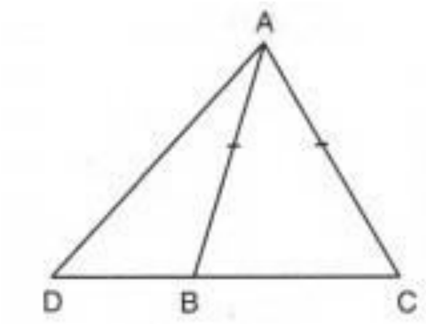
$\angle$BAD + $\angle$DAC = $\angle$DAC + $\angle$EAC ...[Adding $\angle$DAC to both sides]

$\angle$BAC = $\angle$DAE

DABC $\cong$ DADE ...[By SAS property]

BC = DE ...[c.p.c.t.]

14. In $\triangle$ABC, we have



AB = AC

$\Rightarrow$ $\angle$ABC = $\angle$ACB [$\because$ Angles opp. to equal sides are equal] ...(i)

In $\triangle$ABD, we have

Ext. $\angle$ABC > $\angle$ADB [$\because$ Exterior angle of a $\triangle$ is greater than each of interior opp. angle]

$\Rightarrow$ $\angle$ABC > $\angle$ADB ...(ii)

From (i) and (ii), we get

$\angle$ACB > $\angle$ADB

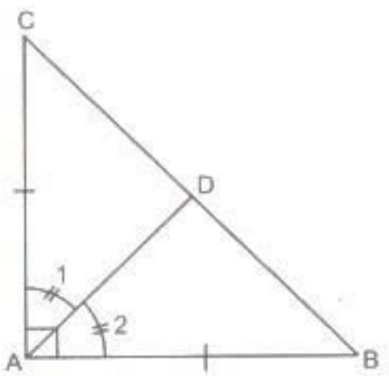
$\Rightarrow$ $\angle$ACD > $\angle$ADC [$\because$ $\angle$ACB = $\angle$ACD, $\angle$ADB = $\angle$ADC]

$\Rightarrow$ AD > AC

$\Rightarrow$ AD > AB [$\because$ AB = AC]

15. Given: ΔABC is a right angled triangle. Bisector of $\angle$A meets BC at D.

Also, given AB = AC & $\angle A = 90^\circ$......(1)



To prove: BC = 2AD

Proof:

Now, in ΔCAD and ΔBAD , we have :-

AC = AB [from (1)]

$\angle CAD = \angle BAD$ [$\because$ AD is the bisector of $\angle A$]

$\Rightarrow \angle 1 = \angle 2.$ [See figure]

AD = AD [Common side]

So, By SAS criterion of congruency of triangles, we have

$\Delta CAD \cong \Delta BAD$

$\therefore \quad CD = BD$ [CPCT]

Hence , D is midpoint of hypotenuse AC.

Since ,Mid-point of hypotenuse of a rt. Δ is equidistant from the vertices of the Δ .

Hence, AD = BD = CD ....(2)

Now, BC = BD + CD

$\Rightarrow \quad BC = AD + AD$ [Using (2)]

$\Rightarrow BC = 2AD$

Hence, proved.