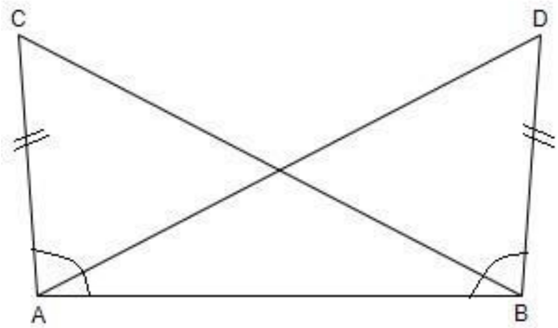
CBSE Test Paper 02

CH-7 Triangles

1. In the adjoining figure, AC = BD. If $\angle$CAB = $\angle$DBA, then $\angle$ACB is equal to



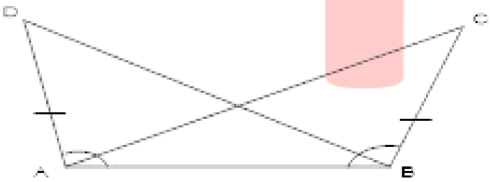
   a. $\angle$ABC

   b. $\angle$BDA

   c. $\angle$ABD

   d. $\angle$BAD

2. In fig, if AD =BC and $\angle BAD = \angle ABC$, then $\angle$ ACB is equal to



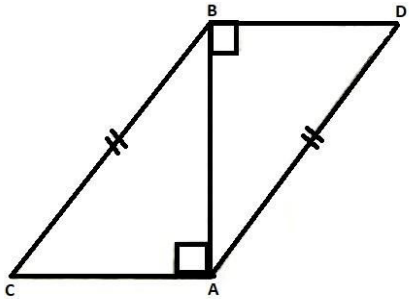
   a. $\angle$BDA

   b. $\angle$BAC

   c. $\angle$ABD

   d. $\angle$BAD

3. In the adjoining figure, BC = AD, CA$\perp$AB and BD$\perp$AB. The rule by which $\triangle ABC \cong \triangle BAD$ is



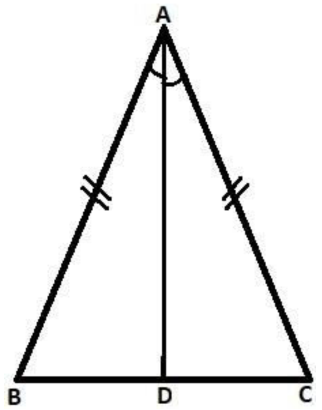
a. ASA

b. RHS

c. SSS

d. SAS

4. In the adjoining figure, AB = AC and AD is bisector of ∠A. The rule by which $\triangle ABD \cong \triangle ACD$



a. SSS

b. SAS

c. AAS

d. ASA

5. The sum of the interior angles of a triangle is:

a. 270^0

b. 360^0

c. 180^0

d. 90^0

6. Fill in the blanks:

In $\triangle$PQR, if $\angle R = \angle P$, QR = 4cm and PR = 5cm, then the length of PQ is________.

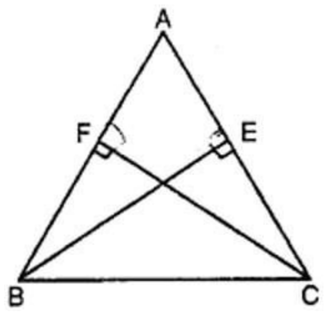
7. Fill in the blanks:

If the altitudes from two vertices of a triangle to the opposite sides are equal, then the type of triangle will be formed is________.

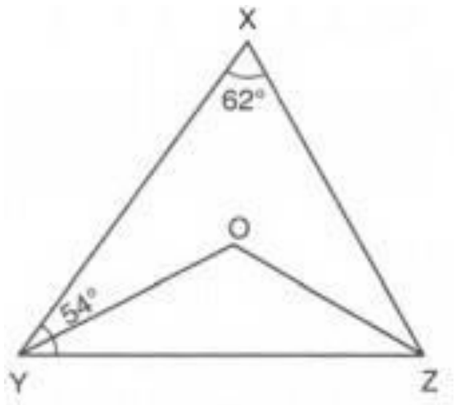
8. In a $\triangle$ABC, $\angle$B = 105^o, $\angle$C = 50^o. Find $\angle$A.

9. The sum of two angles of a triangle is equal to its third angle. Determine the measure of the third angle.

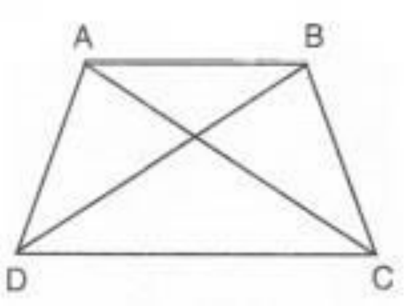
10. ABC is an isosceles triangle in which altitudes BE and CF are drawn to sides AC and AB respectively (See figure). Show that these altitudes are equal.



11. In a given figure, $\angle$X = 62^o, $\angle$XYZ = 54^o. If YO and ZO are bisectors of $\angle$XYZ and $\angle$XZY respectively of $\triangle$XYZ, find $\angle$OZY and $\angle$YOZ.

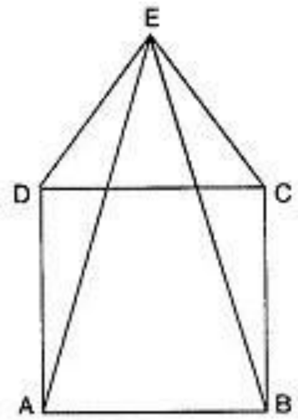


12. In Fig., AD = BC and BD = CA. Prove that ∠DAB = ∠CBA.



13. ABCD is a parallelogram, if the two diagonals are equal, ∠ABC = 90^{o}

14. ABCD is a square and DEC is an equilateral triangle. Prove that AE = BE.



15. ΔABC and ΔDBC are two triangles on the same base BC such that A and D lie on the opposite sides of BC, AB = AC and DB = DC. Show that AD is the perpendicular bisector of BC.

CBSE Test Paper 02
CH-7 Triangles

Solution

1. (b) $\angle$BDA
   Explanation: In Triangle CAB and traingle DBA,
   AC = BD and $\angle$CAB = $\angle$DBA (Given)
   AB (Common)
   Therefore, Triangle CAB and traingle DBA are congruent by SAS criteria
   Therefore, $\angle$ACB = $\angle$BDA (by CPCT)
2. (a) $\angle$BDA
   Explanation: The two triangles are congruent according to (SAS CONGRUENCY) as AD = BC(given) , $\angle$BAD = $\angle$ABC (given) and AB = AB (common) and hence corresponding angles are equal(cpct).
3. (b) RHS
   Explanation:
   In $\triangle$ ABC and $\triangle \angle BAC = \angle ABD$
   BAD, we have (Right angles)
   BC = AD (Hypotentuses and Given)
   AB = AB (common in both)
   Hence, $\triangle ABC \cong \triangle BAD$ by RHS criterion.
4. (b) SAS
   Explanation:
   In $\triangle$ ABD and $\triangle$ ADC, we have
   AB = AC (Given)
   $\angle$BAD = $\angle$DAC (Since AD, bisects $\angle$A)
   AD = AD (common in both)
   Hence, $\triangle ABD \cong \triangle ACD$ by SAS

5. (c) 180^0

   Explanation:

For a triangle,

Number of sides (n)= 3

Sum of interior angles = (n-2) x 180°

= (3 – 2) x 180°

= 1 x 180°

= 180°

6. 4cm

7. isosceles

8. Using angle sum property in $\triangle$ABC, we obtain

$\angle A + \angle B + \angle C = 180^o$

$\Rightarrow \angle A + 105^o + 50^o = 180^o \Rightarrow \angle A = 180^o - 155^o = 25^o$

9. Let ABC be a triangle such that

$\angle A + \angle B = \angle C$ … (i)

We know that $\angle A + \angle B + \angle C = 180^o$…. (ii)

Putting $\angle A + \angle B = \angle C$ in (ii), we get

$\angle C + \angle C = 180^o \Rightarrow 2\angle C = 90^o$

Thus, measure of the third angle is 90^o.

10. In $\triangle$ABE and $\triangle$ACF,

$\angle A = \angle A$ [Common]

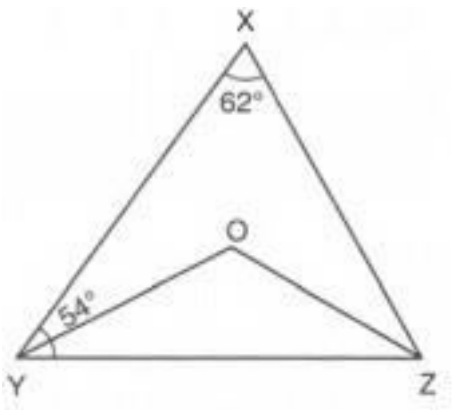
$\angle AEB = \angle AFC$ = [90°]

AB = AC [Given]

$\therefore \triangle ABE \cong \triangle ACF$ [By ASA congruency]

$\therefore$ BE = CF [By C.P.C.T.]

So Altitudes are equal.

11. 

Given: $\angle X = 62^o$, $\angle XYZ = 54^o$ and YO and ZO are bisectors of $\angle XYZ$ and $\angle XZY$ respectively

To find: $\angle OZY$ and $\angle YOZ$.

Consider $\triangle$XYZ, we have

$\angle X+\angle Y+\angle Z = 180°$ [By angle sum property for triangles]

$62° + 54° + \angle XZY = 180°$

$\Rightarrow \angle XZY = 180° - 116°$

$\Rightarrow \angle XZY= 64°$...(i)

Now given that YO is the bisector of $\angle XYZ$, we get

$\Rightarrow \angle XYZ = 2\angle OYZ$

$\Rightarrow 2\angle OYZ = 54°$

$\Rightarrow \angle OYZ = 27°$ ....(ii)

Again given that ZO is the bisector of $\angle XZY$, we get

$\Rightarrow \angle XZY = 2\angle OZY$

$\Rightarrow 2\angle OZY = 64°$ [from (i)]

$\Rightarrow \angle OZY = 32°$...(iii)

In OYZ, we have,

$\angle OYZ + \angle OZY + \angle YOZ = 180°$ [By angle sum property for triangles]

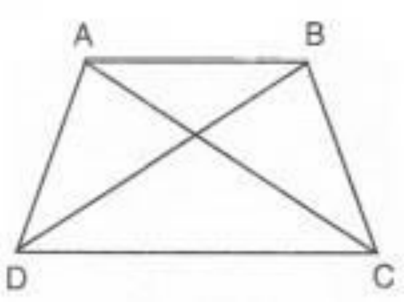
$\Rightarrow 27° + 32° + \angle YOZ = 180°$

$\Rightarrow \angle YOZ = 180° - (27° + 32°)$ [from (ii) and (iii)]

$\Rightarrow \angle YOZ= 180° - 59°$

$\Rightarrow \angle YOZ = 121°$

Hence $\angle OZY = 32°$, $\angle YOZ = 121°$

12. 

Given: In Fig., AD = BC and BD = CA.

To Prove: ∠DAB = ∠CBA.

Proof: In ΔABD and ΔABC, we have

AD = BC [Given]

BD = CA [Given]

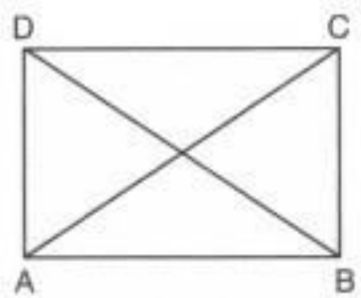
and, AB = AB [Common]

△ABD ≅ △CBA [by SSS congruence criterion]

⇒ ∠DAB = ∠ABC [CPCT]

⇒ ∠DAB = ∠CBA

Hence proved.

13. 

Given: ABCD is a parallelogram and AC = DB

To find: ∠ABC.

Solution: Since ABCD is a parallelogram. Therefore,

Consider △ ABD and △ACB, we have

AD = BC [∵Opposite sides of a parallelogram are equal]

BD = AC [∵Opposite sides of a parallelogram are equal]

and, AB = AB [Common]

△ABD ≅ △ACB [By SSS criterion of congruence]

⇒ ∠BAD = ∠ABC [CPCT] ...(i)

Now, AD || BC and transversal AB intersects them at A and B respectively.

The sum of the interior angles on the same side of a transversal is 180°.

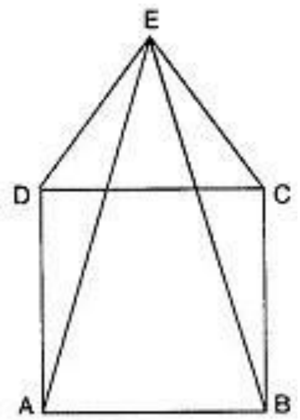
∴ ∠BAD + ∠ABC = 180^o

$\Rightarrow \angle ABC + \angle ABC = 180^o$ [Using (i)]

$\Rightarrow 2\angle ABC = 180^o$

$\Rightarrow \angle ABC = 90^o$

Hence, the measure of $\angle ABC$ is 90^o.

14. 

In DEDA and DECB,

DE = CE .... [Sides of an equilateral triangle]

AD = BC........ [Sides of a square]

$\angle EDA = \angle ECB$ . . . .[As $\angle EDC = \angle ECD$ and $\angle ADC = \angle BCD$]

$\angle EDC + \angle ADC = \angle ECD + \angle BCD$ .... [By addition]

$\Rightarrow \angle EDA = \angle ECB$

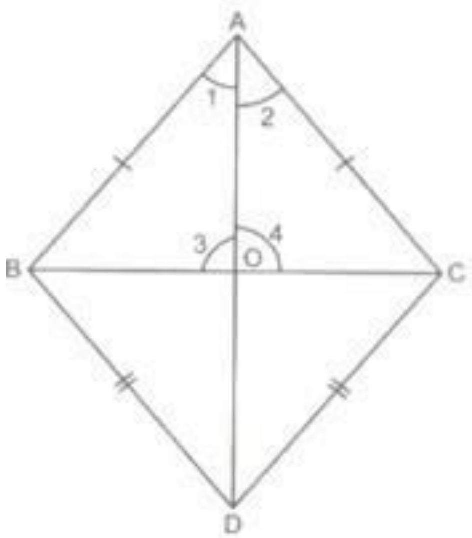
$\therefore$ DEDA $\cong$ DECB ..... [By SAS property]

$\therefore$ AE = BE ......[c.p.c.t.]

15. Given: ΔABC and ΔDBC are on the same base BC.

Also given, AB = AC and BD = DC .... (1)

To prove: AD is the perpendicular bisector of BC. i.e., AD $\perp$ BC & OB = OC



Proof: In ΔBAD and ΔCAD , we have :-

AB = AC [from (1)]

BD = CD [from (1)]

AD = AD [Common side]

So, by SSS criterion of congruency of triangles, we have

$\Delta BAD \cong \Delta CAD$

$\Rightarrow \angle DAB = \angle DAC$ [CPCT]

$\therefore \angle 1 = \angle 2$ ....(2)

Now, in ΔBAO and ΔCAO , we have :-

AB = AC [from (1)]

$\angle 1 = \angle 2$ [From (2)]

AO = AO [Common side]

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

$\Delta BAO \cong \Delta CAO$

$\therefore BO = CO$ [CPCT] ....(3)

&, $\angle AOB = \angle AOC$ [CPCT]

$\Rightarrow \angle 3 = \angle 4$ ....(4)

But, $\angle 3 + \angle 4 = 180^\circ$ [angles on the same line]

$\Rightarrow \angle 3 + \angle 3 = 180^\circ$[from (4)]

$\Rightarrow 2\angle 3 = 180^\circ$

$\Rightarrow \angle 3 = \frac{180^\circ}{2} = 90^\circ$

$\Rightarrow AD \perp BC$ ....(5)

Hence ,from (3) & (5)

AD is perpendicular bisector of BC [∵ BO = CO & $AD \perp BC$]

Hence, proved.