CHAPTER 7

Triangles

1. OBJECTIVE QUESTIONS

1. If two sides of a triangle are unequal then opposite angle of larger side is
(a) greater (b) less
(c) equal (d) half

Ans : (a) greater

2. Which of the following is a correct statement?
(a) In an isosceles triangle, the angles opposite to equal sides are equal.
(b) If the hypotenuse and an acute angle of the right-angled triangle are not equal to the hypotenuse and the corresponding acute angle of another triangle, then the triangles are congruent.
(c) The bisector of the vertical angle of an isosceles triangle bisects the base at acute angles.
(d) All of these

Ans : (a) In an isosceles triangle, the angles opposite to equal sides are equal.

3. Which of the following is a correct statement?
(a) Two triangles having same shape are congruent.
(b) If two sides of a triangle are equal to the corresponding sides of another triangle, then the two triangles are congruent.
(c) If the hypotenuse and one side of one right triangle are equal to the hypotenuse and one side of the other triangle, then the triangles are not congruent.
(d) None of these

Ans : (d) None of these

4. If $\Delta ABC \cong \Delta PQR$ and ΔABC is not congruent to ΔRPQ, then which of the following is not true?
(a) $BC = PQ$ (b) $AC = PR$
(c) $AB = PQ$ (d) $QR = BC$

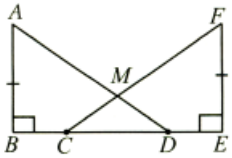
Ans : (a) $BC = PQ$

If $\Delta ABC \cong \Delta PQR$, then their respective congruent sides and angles will be as follows

$$AB = PQ, \angle A = \angle P$$
$$BC = QR, \angle B = \angle Q$$
$$AC = PR, \angle C = \angle R$$

Thus, only (a) is not true.

5. In the given figure, $AB \perp BE$ and $EF \perp BE$. Also $BC = DE$ and $AB = EF$. Then



(a) $\Delta ABC \cong \Delta FEC$ (b) $\Delta ABD \cong \Delta EFC$
(c) $\Delta ABD \cong \Delta CMD$ (d) $\Delta ABD \cong \Delta CEF$

Ans : (a) $\Delta ABC \cong \Delta FEC$

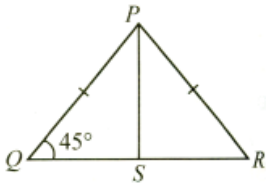
$$BC = DE$$
$$BC + CD = DE + CD$$
$$BD = EC \quad ...(i)$$

Now, $AB = FE$ ...(ii)

and $\angle ABD = \angle FEC = 90^\circ$ ...(iii)

From (i), (ii) and (iii), we get
$\Delta ABC \cong \Delta FEC$ [SAS congruency]

6. In the given figure, PS is the median, bisecting angle P, then $\angle QPS$ is



(a) 110° (b) 70°
(c) 45° (d) 55°

Ans : (c) 45°

Since $PQ = PR$

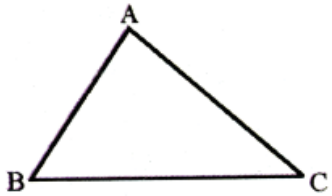
$$\angle Q = \angle R = 45^\circ$$

Then, $\angle P = 180^\circ - 90^\circ = 90^\circ$ (Angle sum property)
Since PS is the median which divides $\angle P$ into two equal parts $\angle QPS = 45^\circ$

7. In ΔABC, if $\angle C > \angle B$, then
(a) $BC > AC$ (b) $AB > AC$
(c) $AB < AC$ (d) $BC < AC$

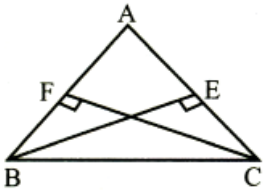
Ans : (b) $AB > AC$

In ΔABC
Given, $\angle C > \angle B$



We know that in a triangle the greater angle has the longer side opposite to it.
Thus, $AB > AC$

8. In the given figure if $BE = CF$, then



(a) $\Delta ABE \cong \Delta ACF$ (b) $\Delta ABE \cong \Delta AFC$
(c) $\Delta ABE \cong \Delta CAF$ (d) $\Delta AEB \cong \Delta AFC$

Ans : (a) $\Delta ABE \cong \Delta ACF$

In triangle ABE and ACF,

$$BE = CF$$
$$\angle CFA = \angle BEA = 90^\circ$$

$\angle A$ is common.

Hence, $\Delta ABE \cong \Delta ACF$ [AAS Criterion]

9. Can we draw a triangle ABC with $AB = 3\,\text{cm}$, $BC = 3.5\,\text{cm}$ and $CA = 6.5\,\text{cm}$?
(a) Yes (b) No
(c) Can't be determined (d) None of these

Ans : (b) No

In ΔABC, $AB = 3\,\text{cm}$,
$BC = 3.5\,\text{cm}$, $CA = 6.5\,\text{cm}$

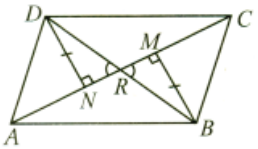
Since $AB + BC > CA$

as $3\,\text{cm} + 3.5\,\text{cm} = 6.5\,\text{cm} = CA$
ΔABC is not possible.

10. Which of the following is not a criterion for congruence of triangles?
(a) SSA (b) SAS
(c) ASA (d) SSS

Ans : (a) SSA

11. In quadrilateral $ABCD$, BM and DN are drawn perpendicular to AC such that $BM = DN$. If $BR = 8\,\text{cm}$, then BD is



(a) 4 cm (b) 2 cm
(c) 12 cm (d) 16 cm

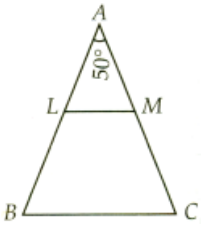
Ans : (d) 16 cm

Consider triangle, DNR and BMR

$DN = BM$ [Given]
$\angle DNR = \angle BMR$ [Each 90°]
$\angle DRN = \angle BRM$
[Vertically opposite angles]
$\Delta DNR \cong \Delta BMR$ [AAS congruency]

By C.P.C.T., $DR = BR$
$BD = 2 \times 8 = 16\,\text{cm}$

12. Inthe figure, ABC is an isosceles triangle in which $AB = AC$ and LM is parallel to BC. If $\angle A = 50^\circ$, find $\angle LMC$.



(a) 60° (b) 100°
(c) 115° (d) None of these

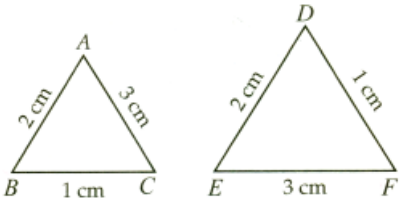
Ans : (c) 115°

In ΔABC, $AB = BC$
$\angle ABC = \angle ACB = \theta$
$\angle B = \angle C = \theta$

Now,

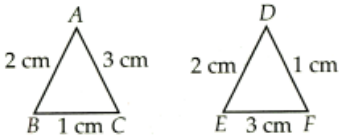
$$\angle A + \angle B + \angle C = 180^\circ$$
$$50^\circ + \theta + \theta = 180^\circ$$
$$2\theta = 180^\circ - 50^\circ = 130^\circ$$
$$\theta = 65^\circ$$
$$\angle B = \angle C = 65^\circ$$
$$LM \parallel BC$$
$$\angle LMC + \angle BCM = 180^\circ$$
$$\angle LMC + 65^\circ = 180^\circ$$
$$\angle LMC = 180^\circ - 65^\circ$$
$$\angle LMC = 115^\circ$$

13. For the given triangles, write the correspondence, if they are congruent.



(a) $\Delta ABC \cong \Delta DEF$ (b) $\Delta ABC \cong \Delta EDF$
(c) $\Delta ABC \cong \Delta FDE$ (d) not congruent

Ans : (b) $\Delta ABC \cong \Delta EDF$



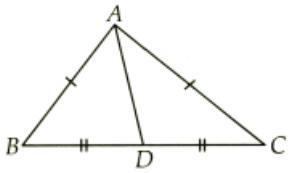
$AB = ED = 2\,\text{cm}$
$BC = DF = 1\,\text{cm}$
$AC = EF = 3\,\text{cm}$
$\Rightarrow \Delta ABC \cong \Delta EDF$ (by SSS Rule)

14. In $\triangle ABC$, if $\angle B < \angle A$, then
(a) $BC > CA$ (b) $BC < CA$
(c) $BC > AB + CA$ (d) $AB < CA$

Ans : (a) $BC > CA$

$BC > CA$ (opposite side of larger angle is greater then the opposite side of smaller angle)

15. In $\triangle ABC$, if $AB = AC$ and $BD = DC$ (see figure), then $\angle ADC =$

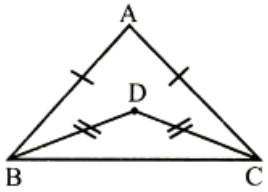


(a) 60° (b) 45°
(c) 120° (d) 90°

Ans : (d) 90°

We have $AB = AC$ and $BD = DC$
$\Rightarrow$ D is a mid point of BC
$\Rightarrow$ $\angle ADB = \angle ADC = 90^\circ$

16. In the given figure, the ratio $\angle ABD : \angle ACD$ is

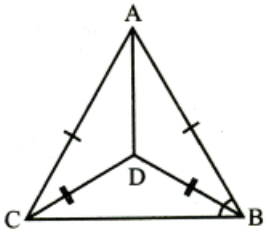


(a) 1 : 1 (b) 2 : 1
(c) 1 : 2 (d) 2 : 3

Ans : (a) 1 : 1

Join A to D,

then, $\Delta ABD \cong \Delta ACD$ [SSS Criterion]



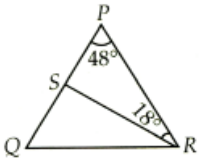
$\angle ABD = \angle ACD$ [CPCT]

Hence, $\angle ABD : \angle ACD = 1:1$

17. In the given figure, $PQ = QR$, $\angle QPR = 48^\circ$, $\angle SRP = 18^\circ$, then $\angle PQR =$

(a) 48° (b) 84°
(c) 30° (d) 36°

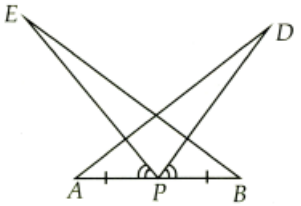
Ans : (b) 84°



$PQ = QR$
$\angle QPR = \angle QRP$
$\angle QPR = 48^\circ$

In $\triangle PQR$,
$\angle P + \angle Q + \angle QRP = 180^\circ$
[Angle sum property of Δ]
$48^\circ + \angle Q + 48^\circ = 180^\circ$
$\angle Q = 180^\circ - 96^\circ$
$\angle Q = 84^\circ$

18. AB is a line segment and P is its mid-point. D and E are points on the same side of AB such that $\angle BAD = \angle ABE$ and $\angle EPA = \angle DPB$ (see figure). Which of the following is true?



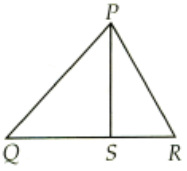
(a) $\triangle APD \cong \triangle BPE$ (b) $\angle APE = \angle DPE$
(c) $AP = BE$ (d) None of these

Ans : (a) $\triangle APD \cong \triangle BPE$

$\angle APE = \angle BPD$ [Given]
$\angle APE + \angle DPE = \angle BPD + \angle DPE$
$\angle APD = \angle BPE$
Also, $\angle BAD = \angle ABE$ [Given]
$AP = PB$ [P is mid point of AB]
$\triangle APD \cong \triangle BPE$ (by ASA Rule)

19. If S is any point on the side QR of a $\triangle PQR$, then
(a) $PQ + QR + RP > 2PS$
(b) $PQ + QR + RP < 2PS$
(c) $PQ + QR + RP = 3PS$
(d) None of these

Ans : (a) $PQ + QR + RP > 2PS$



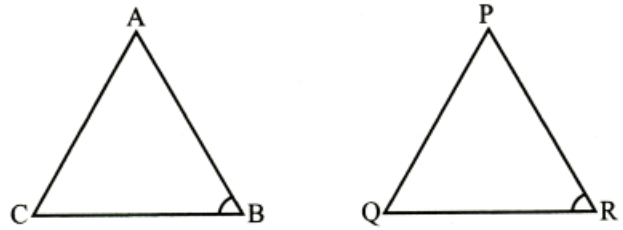
In $\triangle PQS$, we have
$PQ + QS > PS$ ...(i)
[Sum of two sides of a triangle is greater than the third side]
Similarly, in $\triangle PRS$, we have
$RP + RS > PS$ ...(ii)
Adding (i) and (ii), we get

$$(PQ+QS)+(RP+RS) > PS+PS$$
$$PQ+(QS+RS)+RP > 2PS$$
$$PQ+QR+RP > 2PS \ [QS+RS=QR]$$

20. In triangles ABC and PQR, $AB=PQ$ and $\angle B=\angle Q$. The two triangles will be congruent by SAS axiom if
(a) $BC=QR$ (b) $AC=PR$
(c) $AB=QR$ (d) None of these

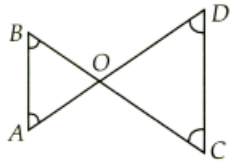
Ans : (a) $BC=QR$

Given, $AB = PQ$
$\angle B = \angle Q$



In order for ΔABC to be congruent to ΔPQR by SAS axiom corresponding sides BC and QR should be equal.

21. In figure, $\angle B<\angle A$ and $\angle C<\angle D$ then

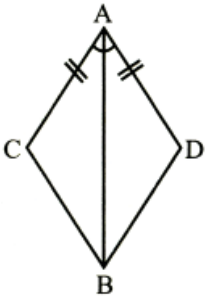


(a) $AD<BC$ (b) $OD>OC$
(c) $OB<OA$ (d) None of these

Ans : (a) $AD<BC$

Since $\angle B < \angle A$ and $\angle C<\angle D$,
then $BO > AO$ and $OC>OD$
[sides opposite to smaller angle is smaller]
$BO+OC > AO+OD$
$BC > AD$

22. In the given figure, the congruency rule used in proving $\Delta ACB \cong \Delta ADB$ is



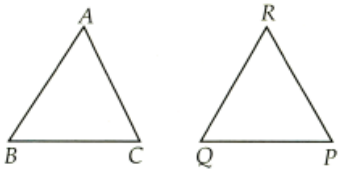
(a) ASA (b) SAS
(c) AAS (d) RHS

Ans : (b) SAS

In ΔACB and ΔADB
$AC = AD$ [Given]
$\angle CAB = \angle DAB$ [Given]
$AB = AB$ [Common]
Hence, $\Delta ACB \cong \Delta ADB$ [SAS]

23. In triangles ABC and $5RQP$, if $AB=AC, \angle C=\angle P$ and $\angle B=\angle Q$, then two triangles are
(a) isosceles but not necessarily congruent
(b) isosceles and congruent
(c) congruent but not isosceles
(d) neither congruent nor isosceles

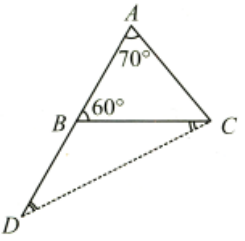
Ans : (a) isosceles but not necessarily congruent



We have $AB = AC$, then $\angle B=\angle C$ ...(1)
$\angle C = \angle P$ [Given] ...(2)
$\angle B = \angle Q$ ...(3)
and $\angle P = \angle Q$ [From (1), (2) and (3)]
$\Rightarrow$ $PR = QR$
$\Rightarrow$ Triangles are isosceles.

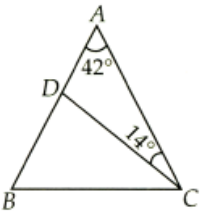
24. In ΔABC, side AB is produced to D so that $BD=BC$. If $\angle B=60^\circ$ and $\angle A=70^\circ$, then
(a) $AD>CD$ (b) $\angle ADC=90^\circ$
(c) $AD<CD$ (d) $\angle CAD=30^\circ$

Ans : (a) $AD>CD$



We have $\angle A = 70^\circ$ and $\angle B=60^\circ$
So, $\angle C = 50^\circ, \angle CAD=120^\circ$
and $\angle BDC = \angle DCB = 30^\circ$
Now, $\angle ACD = 50^\circ+30^\circ=80^\circ$,
$\angle CAD = 70^\circ$ and $\angle ADC=30^\circ$
$\angle ACD > \angle CAD$
$AD > CD$

25. In the given figure, $AB=AC$, $\angle A=42^\circ$ and $\angle ACD=18^\circ$. $\angle BCD$ is equal to



(a) 55° (b) 69°

(c) 45° (d) 50°

Ans : (a) 55°

In $\triangle ABC$,

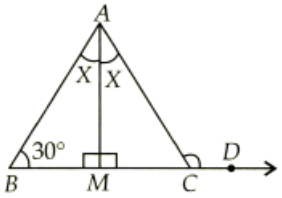
$$\angle A + \angle B + \angle C = 180^\circ$$
$$42^\circ + \angle B + \angle B = 180^\circ$$
$$[AB = AC \Rightarrow \angle B = \angle C]$$
$$42^\circ + 2\angle B = 180^\circ$$
$$2\angle B = 138^\circ$$
$$\angle B = 69^\circ$$

Now, $\angle B = \angle C = 69^\circ$

But $\angle C = \angle BCD + \angle DCA$

$$69^\circ = \angle BCD + 14^\circ$$
$$\angle BCD = 69^\circ - 14^\circ$$
$$\angle BCD = 55^\circ$$

26. In the given figure, find the measure of $\angle ACD$.



(a) 150° (b) 120°
(c) 140° (d) 160°

Ans : (a) 150°

In $\triangle ABM$,

$$\angle MAB + \angle ABM + \angle BMA = 180^\circ$$
[angle sum property]
$$X + 30^\circ + 90^\circ = 180^\circ$$
$$X = 180^\circ - 120^\circ = 60^\circ$$
$$\angle BAC = 60^\circ + 60^\circ = 120^\circ$$

In $\triangle ABC$,

$$\angle ABC + \angle CAB + \angle ACB = 180^\circ$$
$$30^\circ + 120^\circ + \angle ACB = 180^\circ$$
$$\angle ACB = 180^\circ - 150^\circ = 30^\circ$$

Now, $\angle ACM + \angle ACD = 180^\circ$ [linear pair]

$$30^\circ + \angle ACD = 180^\circ$$
$$\angle ACD = 180^\circ - 30^\circ = 150^\circ$$

27. In an isosceles triangle $AB = AC$ and BA is produced to D, such that $AB = AD$ then $\angle BCD$ is

(a) 70° (b) 90°
(c) 60° (d) 45°

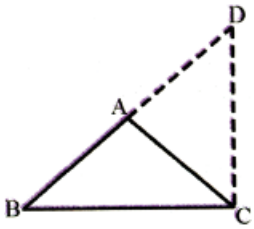
Ans : (b) 90°

Given, $AB = AC$ and $AD = AB$

Now, as we know that angles opposite to equal sides are equal.

Thus, $\angle ABC = \angle ACB$ ...(1)

and, $\angle ADC = \angle ACD$ ...(2)



Adding (1) and (2), we get

$$\angle ABC + \angle ADC = \angle ACB + \angle ACD$$
$$\angle BCD = \angle ABC + \angle ADC$$
$$\angle BCD + \angle BCD = \angle ABC + \angle ADC + \angle BCD$$
[Adding $\angle BCD$ on both sides]
$$2\angle BCD = 180^\circ$$
$$\angle BCD = 90^\circ$$

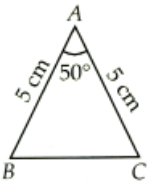
28. In a $\triangle ABC$, $AB = 5\text{cm}, AC = 5\text{cm}$ and $\angle A = 50^\circ$, then $\angle B =$

(a) 35° (b) 65°
(c) 80° (d) 40°

Ans : (b) 65°

$$AB = AC$$

Since angles opposite to equal sides of a triangle are equal.

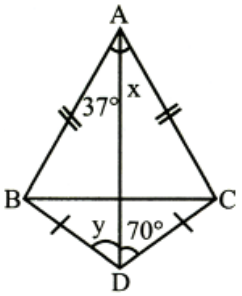


$\angle B = \angle C$. let $\angle B = \angle C = x$

In $\triangle ABC$,

$$\angle A + \angle B + \angle C = 180^\circ$$
$$50^\circ + x + x = 180^\circ$$
$$2x = 130^\circ$$
$$x = 65^\circ$$
$$\angle B = \angle C = 65^\circ$$

29. In the given figure



(a) $x = 70^\circ, y = 37^\circ$ (b) $x = 37^\circ, y = 70^\circ$
(c) $x + y = 107^\circ$ (d) $x - y = 57^\circ$

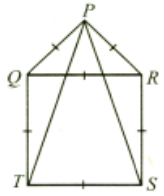
Ans : (b) $x = 37^\circ, y = 70^\circ$

In ΔABD and ΔACD

$$AB = AC \quad \text{[Given]}$$
$$BD = CD \quad \text{[Given]}$$
$$AD = AD \quad \text{[Common]}$$

Hence, $\Delta ABD \cong \Delta ACD$
[SSS congruency criterion]
Hence, $\angle BAD = \angle CAD$ [CPCT]
$x = 37^\circ$
and, $\angle BDA = \angle CDA$ [CPCT]
$y = 70^\circ$

30. In the giver figure, PQR is an equilateral triangle and $QRST$ is a square. Then $\angle PSR =$

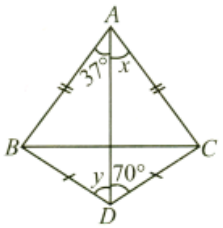


(a) 30° (b) 15°
(c) 90° (d) 60°

Ans : (b) 15°

$\angle PRS = (90^\circ + 60^\circ) = 150^\circ$
$RQ = PR$
[Sides of equilateral triangle]
and $QR = RS$ [Sides of square]
So, $RP = RS$
$\angle RPS = \angle PSR = x$
In ΔPSR,
$\angle PRS + \angle SPR + \angle RSP = 180^\circ$
$150^\circ + x + x = 180^\circ$
$2x = 30^\circ$
$x = 15^\circ$

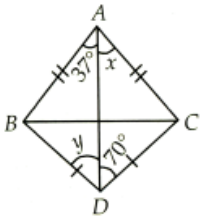
31. In the given figure, x and y are



(a) $x = 70^\circ, y = 37^\circ$ (b) $x = 37^\circ, y = 70^\circ$
(c) $x + y = 117^\circ$ (d) $x - y = 100^\circ$

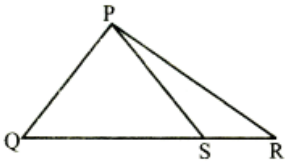
Ans : (b) $x = 37^\circ, y = 70^\circ$

In ΔABD and ΔACD



$AB = AC$ [Given]
$BD = CD$ [Given]
$AD = AD$ [Common]
$\Delta ABD \cong \Delta ACD$ [By SSS Rule]
$\angle BDA = \angle CDA$ [By C.P.C.T.]
$y = 70^\circ$
Similarly, $x = 37^\circ$
$x = 37^\circ, y = 70^\circ$

32. In the given figure, S is any point on the side QR of ΔPQR. What can you say about $PQ + QR + RP$?

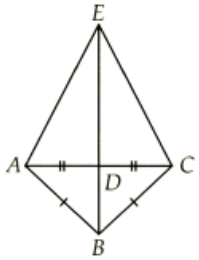


(a) $PQ + QR + RP > 2PS$
(b) $PQ + QR + RP < 2PS$
(c) $PQ + QR + RP = 2PS$
(d) None of these

Ans : (a) $PQ + QR + RP > 2PS$

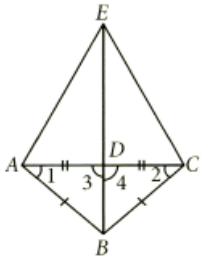
Given : In ΔPQR, S is any point on the side QR.
In ΔPQS,
$PQ + QS > PS$ ...(1)
[Since, Sum of any two sides of a triangle is greater than the third side]
In ΔPSR
$PR + RS > PS$ ...(2)
[Since, Sum of any two sides of a triangle is greater than the third side]
After adding equation (1) and (2), we get
$(PQ + QS) + (PR + RS) > 2PS$
$PQ + (QS + RS) + PR > 2PS$
or $PQ + QR + RP > 2PS$

33. In the given figure, $AB = BC$, $AD = CD$. Then, which of the following is true?



(a) $\angle ADE = 90^\circ$ (b) $AE = EC$
(c) Both (a) and (b) (d) $AE = BC$

Ans : (c) Both (a) and (b)



In ΔABC, $AB = BC$ [Given]
$\angle 1 = \angle 2$
(Angle opposite to equal sides)

In ΔABD and ΔCBD,

$AB = BC$ [Given]

$\angle 1 = \angle 2$ [Proved above]

$AD = CD$ [Given]

$\Delta ABD = \Delta CBD$ [By SAS congruency]

$\angle 3 = \angle 4$ (By C.P.C.T.)

But $\angle 3 + \angle 4 = 180^\circ$ [linear pair]

$2\angle 4 = 180^\circ$

$\angle 4 = 90^\circ$

$\angle ADE = 90^\circ$

(Vertically opposite angles)

In ΔEAD and ΔECD,

$AD = CD$ (Given)

$\angle ADE = \angle CDE = 90^\circ$

and $DE = DE$ (Common)

So, $\Delta EAD \cong \Delta ECD$ (By SAS Congruency)

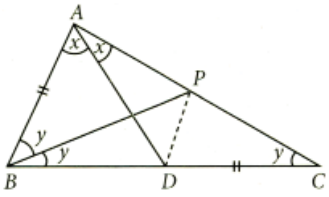
$AE = CE$ (By C.P.C.T.)

34. ABC is a triangle in which $\angle B = 2\angle C$. D is a point on BC such that AD bisects $\angle BAC$ and $AB = CD$, then $\angle BAC =$

(a) 144° (b) 36°

(c) 72° (d) 98°

Ans : (c) 72°



In ΔABC, we have

$\angle B = 2\angle C$

or, $\angle B = 2y$,

where $\angle C = y$

AD is the bisector of $\angle BAC$.

So, let $\angle BAD = \angle CAD = x$

Let BP be the bisector of $\angle ABC$. Join PD.

In $\angle BPC$, we have

$\angle CBP = \angle BCP = y$

$BP = PC$ ...(1)

In ΔABP and ΔDCP,we have

$\angle ABP = \angle DCP = y$

$AB = DC$ (Given)

and $BP = PC$ [By (1)]

$\Delta ABP \cong \Delta DCP$

[By SAS congruence criterion]

$\angle BAP = \angle CDP$ and $AP = DP$

$\angle CDP = 2x$

and $\angle ADP = \angle DAP = x$ $[\angle A = 2x]$

In ΔABD, we have

$\angle ADC = \angle ABD + \angle BAD$

$x + 2x = 2y + x$

$x = y$

In ΔABC, we have

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

$2x + 2y + y = 180^\circ$

$5x = 180^\circ$ $[x = y]$

$x = 36^\circ$

Hence, $\angle BAC = 2x = 72^\circ$

2. FILL IN THE BLANK

DIRECTION : Complete the following statements with an appropriate word/term to be filled in the blank space(s).

1. In ΔABC, $\angle A > \angle B$ and $\angle B > \angle C$, then smallest side is .....

Ans : AB

2. If $\Delta ABC \cong \Delta LKM$, then side of ΔLKM equal to side AC of ΔABC is .....

Ans : LM

3. Sum of any two sides of a triangle is greater than the ..... side.

Ans : third

4. If $\angle C$ is right angle in ΔABC, then larger side is .....

Ans : AB

5. If $\Delta ABC \cong \Delta ACB$, then ΔABC is isosceles with $AB =$ .....

Ans : AC

6. If $\Delta PQR \cong \Delta EFD$, then $\angle E =$ .....

Ans : $\angle E = \angle P$

7. The angles opposite of equal sides of a triangle are .....

Ans : equal

8. If $\Delta PQR \cong \Delta EFD$, then $ED =$ .....

Ans : PR

9. If two angles and the included side of one triangle are equal to two angles and the included side of the other triangle, then the two triangles are .....

Ans : congruent

10. In a triangle, angle opposite to the longer side is .....

Ans : larger

3. TRUE/FALSE

DIRECTION : Read the following statements and write your answer as true or false.

1. All the angles of a triangle can be less than $60°$.
Ans : False

2. A right angled triangle may be a scalene triangle.
Ans : True

3. The angles of a triangle are in the ratio $2:1:3$. Triangle is a right angled triangle.
Ans : True

4. Scalene triangle may be an acute-angled triangle.
Ans : True

5. A triangle can have at most one obtuse angle.
Ans : True

6. An obtuse angled triangle may be an equilateral triangle.
Ans : False

7. A triangle can have two right angles.
Ans : False

8. All the angles of a triangle can be equal to $60°$.
Ans : True

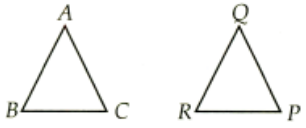
9. An isosceles triangle may be a right angled triangle.
Ans : True

10. If two sides of a triangle are unequal, the greater side has the greater angle opposite to it.
Ans : True

4. MATCHING QUESTIONS

DIRECTION : In the section, each question has two matching lists. Choices for the correct combination of elements from Column-I and Column-II are given as options (a), (b), (c) and (d) out of which one is correct.

1.



$\triangle ABC \cong \triangle QRP$. Match the following :

Column-I		Column-II	
(P)	AB	(1)	$\angle Q$
(Q)	BC	(2)	QP
(R)	AC	(3)	QR
(S)	$\angle A$	(4)	RP

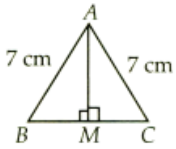
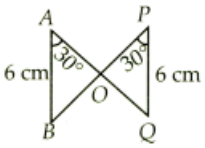
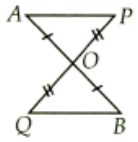
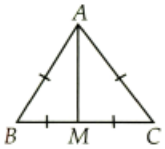
	P	Q	R	S
(a)	1	2	3	4
(b)	3	2	4	1
(c)	3	4	2	1
(d)	2	3	4	1

Ans : (c) P–3, Q–4, R–2, S–1

Since $\triangle ABC \cong \triangle QRP$

$\Rightarrow$ $AB = QR$, $BC = RP$,
$AC = QP$, $\angle A = \angle Q$

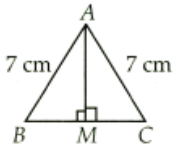
2. Match the following :

Column-I		Column-II	
(P)	 $\triangle AMB \cong \triangle AMC$ by	(1)	SAS Rule
(Q)	 $\triangle AOB \cong \triangle POQ$ by	(2)	RHS Rule
(R)	 $\triangle AOP \cong \triangle BOQ$ by	(3)	SSS Rule
(S)	 $\triangle AMB \cong \triangle AMC$ by	(4)	AAS Rule

	P	Q	R	S
(a)	2	4	1	3
(b)	4	2	1	3
(c)	1	2	4	3
(d)	2	1	3	4

Ans : (a) P–2, Q–4, R–1, S–3

(P) In $\triangle ABM$ and $\triangle ACM$



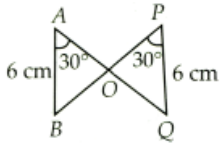
$AB = AC = 7\text{ cm}$

$AM = AM$ [Common side]

$\angle AMB = \angle AMC$ [Each 90°]

$\Rightarrow \triangle AMB \cong \triangle AMC$ [By R.H.S. congruency]

(Q) In $\triangle AOB$ and $\triangle POQ$



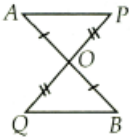
$AB = PQ = 6\text{ cm}$

$\angle BAO = \angle QPO = 30°$

$\angle AOB = \angle POQ$ [Vertically opposite angles]

$\Rightarrow \triangle AOB \cong \triangle POQ$ [By AAS congruency]

(R) In $\triangle AOP$ and $\triangle BOQ$



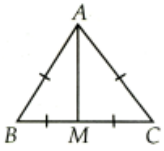
$OA = OB$

$OP = OQ$

$\angle AOP = \angle BOQ$ [Vertically opposite angles]

$\Rightarrow \triangle AOP \cong \triangle BOQ$ [By SAS congruency]

(S) In $\triangle AMB$ and $\triangle AMC$



$AB = AC$ [Given]

$BM = CM$ [Given]

$AM = AM$ [Common]

$\Rightarrow \triangle AMB \cong \triangle AMC$ [By SSS congruency]

5. ASSERTION AND REASON

DIRECTION : In each of the following questions, a statement of Assertion is given followed by a corresponding statement of Reason just below it. Of the statements, mark the correct answer as

(a) Both assertion and reason are true and reason is the correct explanation of assertion.

(b) Both assertion and reason are true but reason is not the correct explanation of assertion.

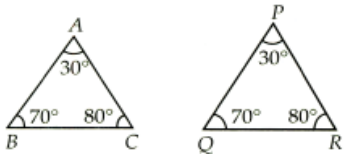
(c) Assertion is true but reason is false.

(d) Assertion is false but reason is true.

1. Assertion : If we draw two triangles with angles $30°, 70°$ and $80°$ and the length of the sides of one triangle be different than that of the corresponding sides of the other triangle then two triangles are not congruent.

Reason : If two triangles are constructed which have all corresponding angles equal but have unequal corresponding sides, then two triangles cannot be congruent to each other.

Ans : (a) Both assertion and reason are true and reason is the correct explanation of assertion.



In $\triangle ABC$ and $\triangle PQR$

$\angle A = \angle P, \angle B = \angle Q, \angle C = \angle R$

But sides are different

There is no rule of congruence as AAA.

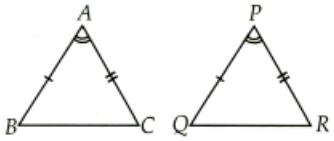
$\triangle ABC \ncong \triangle PQR$

2. Assertion : In $\triangle ABC$ and $\triangle PQR$, $AB = PQ$, $AC = PR$ and $\angle BAC = \angle QPR$

$\triangle ABC \cong \triangle PQR$

Reason : Both the triangles are congruent by SSS congruence.

Ans : (c) Assertion is true but reason is false.



In $\triangle ABC$ and $\triangle PQR$

$AB = PQ$

$AC = PR$

$\angle BAC = \angle QPR$

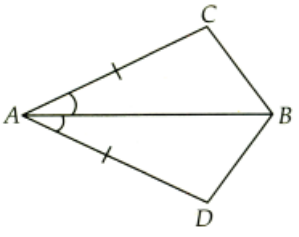
$\triangle ABC \cong \triangle PQR$ (By SAS Rule)

3. Assertion : If the bisector of the vertical angle of a triangle bisects the base of the triangle, then the triangle is equilateral.

Reason : If three sides of one triangle are equal to three of the other triangle, then the two triangles are congruent.

Ans : (d) Assertion is incorrect but Reason is correct.

4. Assertion : In a quadrilateral $ABCD$, $AC = AD$ and AB bisects $\angle A$ (see figure) by SAS congruence criteria.



Reason : Two triangles are congruent if two sides and the included angle of one triangle is equal to the corresponding two sides and included angle of the

other.

Ans : (a) Both assertion and reason are true and reason is the correct explanation of assertion.

In $\triangle ACB$ and $\triangle ADB$

$$AC = AD \quad \text{[Given]}$$
$$\angle CAB = \angle DAB \quad [AB \text{ bisects } \angle A]$$
$$AB = AB \quad \text{[Common]}$$
$$\triangle ACB \cong \triangle ADB$$

[By SAS congruence rule]

5. Assertion : If the base and the altitude of a triangle are 4 cm and 8 cm respectively, then its area is $36\ \text{cm}^2$.

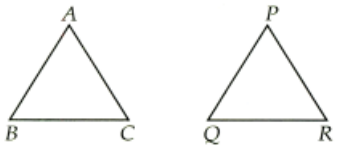
Reason : Area of a triangle $= \frac{1}{2} \times$ base $\times$ altitude.

Ans : (d) Assertion is incorrect but Reason is correct.

6. Assertion : In triangles ABC and PQR, $\angle A = \angle P, \angle C = \angle R$ and $AC = PR$.
The two triangles are congruent by ASA congruence.

Reason : If two angles and included side of a triangle are equal to the corresponding angles and side of the other triangle then the triangles are congruent by ASA congruence criteria.

Ans : (a) Both assertion and reason are true and reason is the correct explanation of assertion.



$$\angle A = \angle P, \angle C = \angle R \text{ and } AC = PR$$
$$\triangle ABC \cong \triangle PQR \quad \text{[ASA congruence rule]}$$

7. Assertion : When two triangles are congruent then their corresponding angles are equal.

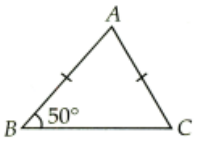
Reason : Two triangles are congruent if their shapes and size are not same.

Ans : (c) Assertion is correct but Reason is incorrect.

8. Assertion : In $\triangle ABC, AB = AC$ and $\angle B = 50^\circ$, then $\angle C$ is 50°.

Reason : In a triangle, angles opposite to equal sides are equal.

Ans : (a) Both assertion and reason are true and reason is the correct explanation of assertion.



Since $AB = AC$,

then $\angle B = \angle C$

9. Assertion : Angles opposite to equal sides of a triangle are equal.

Reason : Sides opposite to equal angles of a triangle are not equal.

Ans : (c) Assertion is correct but Reason is incorrect.