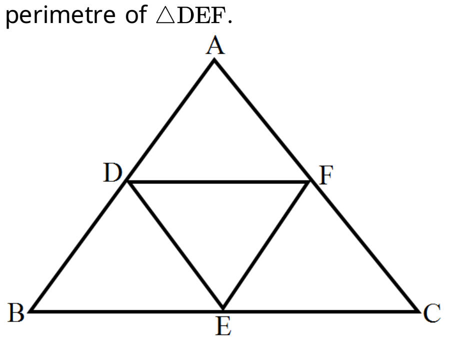
*** Choose the right answer from the given options. [1 Marks Each]** **[10]**

1. In $\triangle ABC$, if $\angle B = 30^\circ$ and $\angle C = 70^\circ$, then which of the following is the longest side?
(A) AC (B) BC (C) AB (D) AB or AC

Ans. :
b. BC
Solution:
Since the sum of all sides of a triangle is 180°.
So, $\angle C = 70^\circ$, $\angle B = 70^\circ$, $\angle A = 80^\circ$,
We have a theorem which states that the side opposite to the greatest angle is the longest.
So, the side opposite to angle A is the longest.

2. D, E and F are the mid points of sides AB, BC and CA of $\triangle ABC$. If perimetre of $\triangle ABC$. is 16cm, then perimetre of $\triangle DEF$.



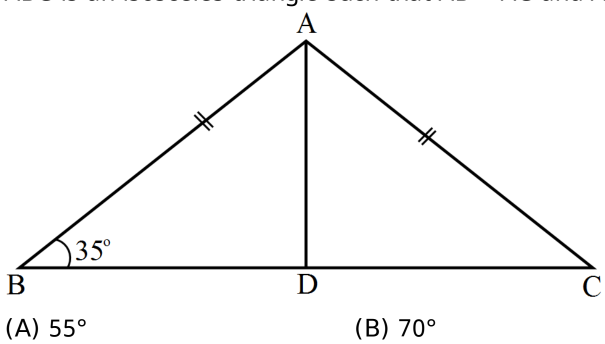
(A) 4cm (B) 8cm (C) None of these (D) 32cm

Ans. :
b. 8cm
Solution:
Using relation,
$\text{Perimeter}. \triangle DEF = \frac{1}{2} \text{Perimeter}. \triangle ABC$
$= \frac{1}{2} \times 16 = 18\text{cm}$

3. In $\triangle ABC$, $\angle A = 35^\circ$ and $\angle B = 65^\circ$, then the longest side of the triangle is:
(A) AB (B) BC (C) AC (D) None of these

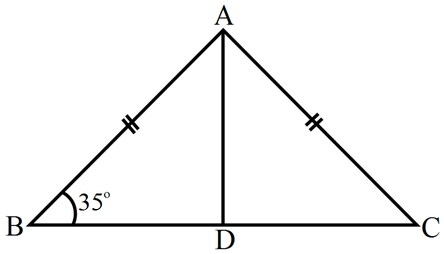
Ans. :
a. AB
Solution:
As per angle sum property, $\angle A + \angle B + \angle C = 180^\circ$
Hence, $35^\circ + 65^\circ + \angle C = 180^\circ$
$\Rightarrow \angle C = 80^\circ$ which is the greatest angle.
We know that the side opposite to the greatest angle i.e AB would be the greatest.
Hence, AB is the longest side.

4. ABC is an isosceles triangle such that AB = AC and AD is the median to base BC. Then, $\angle BAD =$



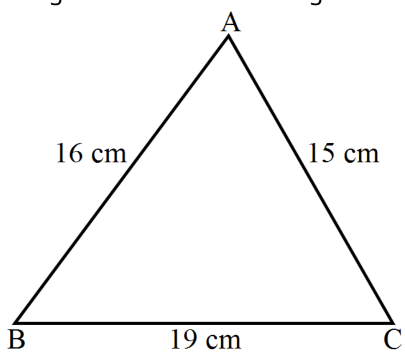
(A) 55° (B) 70° (C) 35° (D) 110°

Ans. :
a. 55°
Solution:



If AD is the median, then D is the mid-point of BC.
$BD = DC$
So consider $\triangle ADB$ and $\triangle ADC$
$AD = AD$ (common)
$DB = DC$
$BA = CA$
So by SSS, $\triangle ADB \cong \triangle ADC$
Now $\angle B = \angle C = 35^\circ$
$\Rightarrow \angle BAD = \angle DAC$
So in $\triangle ABC$,
$\angle A + \angle B + \angle C = 180^\circ$
$\Rightarrow 2\angle BAD + 35^\circ + 35^\circ = 180^\circ$
$\Rightarrow 2\angle BAD = 110^\circ$
$\Rightarrow \angle BAD = 55^\circ$
Hence, correct option is (a).

5. In fig. which of the following statement is true?



(A) $\angle B = \angle C$
(B) $\angle B$ is the smallest angle in the triangle.
(C) $\angle B$ is the greatest angle in the triangle.
(D) $\angle A$ is the smallest angle in the triangle.

Ans. :

b. $\angle B$ is the smallest angle in the triangle.
Solution:
In a triangle angle opposite to smallest side is least AC is least side and hence B is smaller.

6. It is not possible to construct a triangle when the lengths of its sides are:
(A) 5.3cm, 2.2cm, 3.1cm
(B) 6cm, 7cm, 8cm
(C) 4cm, 6cm, 6cm
(D) 9.3cm, 5.2cm, 7.4cm

Ans. :

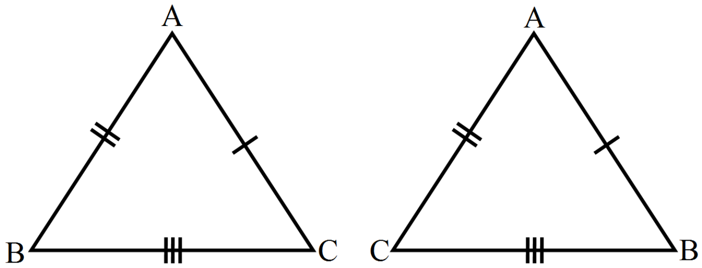
a. 5.3cm, 2.2cm, 3.1cm
Solution:
Put the sidesof triangle a, b, c
For a possible triangle the following are should possible.
a + b > = c
b + c > = a
a + c > = b
Here, 2.2 + 3.1 = 5.3
So, a + b = c
So the triangle becomes a streight line.
So we cannot draw a triangle with sides 5.3cm, 2.2cm, 3.1cm.

7. If $\triangle ABC \cong \triangle ACB$, then $\triangle ABC$ is isosceles with.
(A) AB = AC
(B) AB = BC
(C) AC = BC
(D) None of these

Ans. :

a. $AB = AC$

Solution:



$\triangle ABC \cong \triangle ACB$

$\Rightarrow AB = AC$

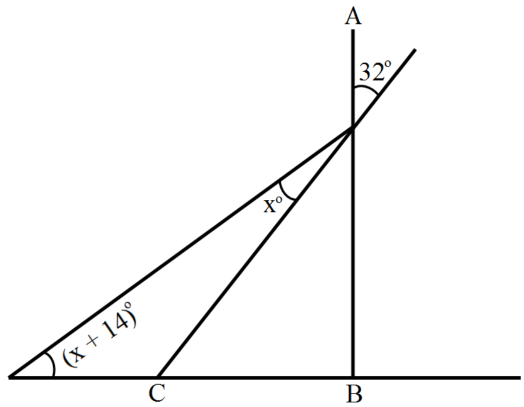
or

$AC = AB$

So, in $\triangle ABC$ is isosceles with $AB = AC$.

Hence, correct option (a).

8. In Fig. if $AB \perp BC,$ then x =



(A) 18° (B) 22° (C) 25° (D) 32°

Ans. :

b. 22°

Solution:

$AB \perp BC$

$\Rightarrow \angle ABC = 90^{\circ}$

$\angle CAB = 32^{\circ}$ (Opposite angles)

Now, in $\triangle ABD$

$\angle DAB = x^{\circ} + 32^{\circ}$

$\angle ABD = 90^{\circ}$

$\angle BDA = x^{\circ} + 14^{\circ}$

In a $\triangle$, sum of all angles = 180°

$\Rightarrow \angle DAB + \angle ABD + \angle BDA = 180^{\circ}$

$\Rightarrow x^{\circ} + 32^{\circ} + 90^{\circ} + x^{\circ} + 14^{\circ} = 180^{\circ}$

$\Rightarrow 2x^{\circ} = 180^{\circ} - 136^{\circ}$

$\Rightarrow 2x^{\circ} = 44^{\circ}$

$\Rightarrow x^{\circ} = 22^{\circ}$

9. In triangles ABC and PQR, AB = AC, $\angle C = \angle P$ and $\angle B = \angle Q.$ The two triangles are:

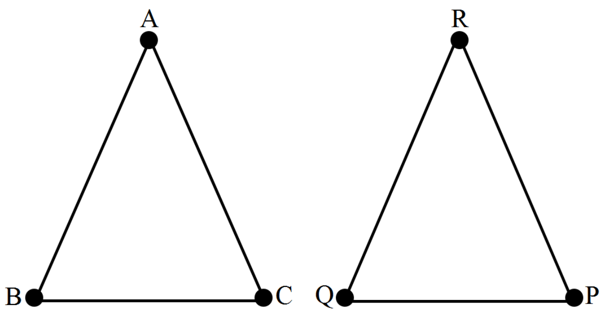
(A) Congruent but not isosceles. (B) Isosceles and congruent. (C) Isosceles but not congruent. (D) Neither congruent nor isosceles.

Ans. :

c. Isosceles but not congruent.

Solution:

Given: $\triangle ABC$ and $\triangle PQR,$ $AB = AC,$ $\angle C = \angle P$ and $\angle B = \angle Q.$



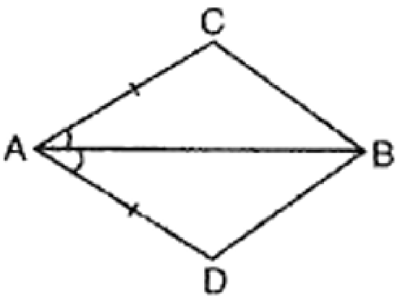
$AB = AC$
$\Rightarrow \angle B = \angle C$ (opposite angles to equal sides are equal)
Hence, $\triangle ABC$ is an isosceles triangle.
$\angle C = \angle P$ and $\angle B = \angle Q$ (given)
$\Rightarrow \angle P = \angle Q$ $(\therefore \angle B = \angle C)$
$\Rightarrow QR = PR$ (opposite sides to equal angles are equal)
Hence, $\triangle PQR$ is an isosceles triangle.
So, the two triangles are isosceles but not congruent.
As AAA is not the criterion for a triangle to be congruent.

10. If a, b, c are the lengths of the sides of a triangle, then
(A) A – B > C (B) C > A + B (C) C < A + B (D) C = A + B

Ans. :
c. C < A + B
Solution:
Put the sidesof triangle a, b, c
For a possible triangle the following are possible.
a + b > = c
b + c > = a
a + c > = b

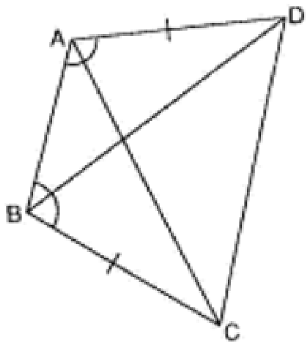
* **Answer the following short questions. [2 Marks Each]** **[8]**

11. In quadrilateral ABCD (See figure). AC = AD and AB bisects $\angle$A. Show that $\triangle$ABC $\cong$ $\triangle$ABD. What can you say about BC and BD?



Ans. : Given: In quadrilateral ABCD, AC = AD and AB bisects $\angle$A.
To prove: $\angle$ABC $\cong$ $\triangle$ABD
Proof: In $\triangle$ABC and $\triangle$ABD,
AC = AD [Given]
$\angle$BAC = $\angle$BAD [$\because$ AB bisects $\angle$A]
AB = AB [Common]
$\therefore$ $\triangle$ABC $\cong$ $\triangle$ABD [By SAS congruency]
Thus BC = BD [By C.P.C.T.]

12. ABCD is a quadrilateral in which AD = BC and $\angle$DAB = $\angle$CBA : Prove that:
i. $\triangle$ ABD $\cong$ $\triangle$ BAC
ii. BD = AC
iii. $\angle$ ABD= $\angle$ BAC



Ans. : In quadrilateral ACBD, we have AD = BC and ∠ DAB = ∠ CBA

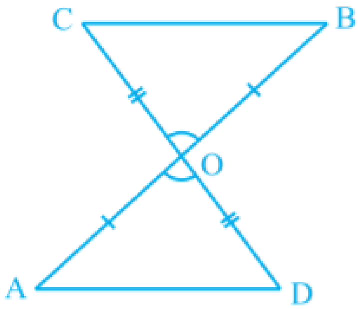
i. In Δ ABC and Δ BAC,
AD = BC (Given)
∠DAB = ∠CBA (Given)
AB = AB (Common)
△ABD ≅ △BAC ...[By SAS Congruence]

ii. Since ΔABD ≅ ΔBAC
⇒ BD = AC [By C.P.C.T.]

iii. Since ΔABD ≅ ΔBAC
⇒ ∠ABD = ∠BAC [By C.P.C.T.]

13. In Fig., OA = OB and OD = OC. Show that

i. △ AOD ≅ △ BOC
ii. AD || BC



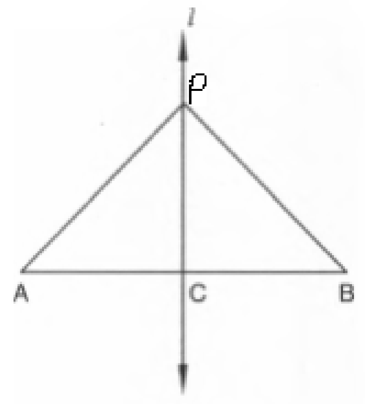
Ans. :

i. You may observe that in △ AOD and △ BOC,
OA = OB (Given)
OD = OC
Also, since ∠ AOD and ∠ BOC form a pair of vertically opposite angles,
we have ∠ AOD = ∠ BOC
So, △ AOD ≅ △ BOC (by the SAS congruence rule)

ii. In congruent triangles AOD and BOC, the other corresponding parts are also equal.
So, ∠ OAD = ∠ OBC and these form a pair of alternate angles for line segments AD and BC.
Therefore, AD || BC

14. AB is a line segment and line l is its perpendicular bisector. If a point P lies on l, show that P is equidistant from A and B.

Ans. : Let C be the mid-point of AB.
Clearly, line l passes through C is perpendicular to AB.
In △PCA and △PCB, we have



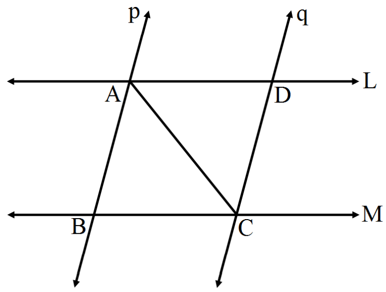
AC = BC [$\because$ C is the mid-point of AB]
PC = PC [common side]
$\angle PCA = \angle PCB$ [Each equal to 90^{o} as l $\perp$ AB]
So, by SAS congruence rule, we obtain
$\triangle PCA \cong \triangle PCB$
$\Rightarrow$ PA = PB

*** Answer the following questions. [3 Marks Each]** **[12]**

15. The angles of a triangle are (x - 40)°, (x - 20)° and $\left(\frac{1}{2}x - 10\right)^{\circ}$. Find the value of x.

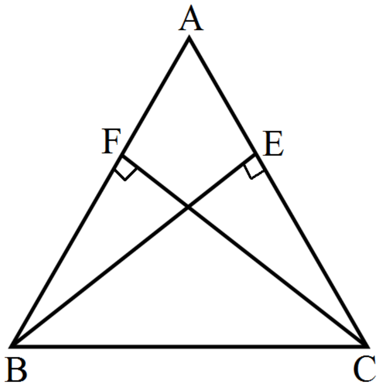
Ans. : Given that,
The angles of a triangle are
$(x - 40^{\circ}), (x - 20^{\circ})$ and $\left(\frac{1}{2}x - 10^{\circ}\right)$
We know that,
Sum of all angles of triangle is 180°
$\therefore (x - 40^{\circ}) + (x - 20^{\circ}) + \left(\frac{1}{2}x - 10^{\circ}\right) = 180^{\circ}$
$2x + \frac{1}{2}x - 70^{\circ} = 180^{\circ}$
$\frac{5}{2}x = 180^{\circ} + 70^{\circ}$
$5x = 2(250)^{\circ}$
$x = \frac{500^{\circ}}{5}$
$\therefore x = 100^{\circ}$

16. In the given figure, two parallel line l and m are intersected by two parallel lines p and q. Show that $\triangle ABC \cong \triangle CDA$.



Ans. : In $\triangle ABC$ and $\triangle CDA$
$\angle BAC = \angle DCA$ (alternate interior angles for p || q)
$AC = CA$ (common)
$\angle BCA = \angle DAC$ (Alternate interior angles for l || m)
$\therefore \triangle ABC \cong \triangle CDA$ (by ASA congruence rule)

17. In the given figure, BE and CF are two equal altitudes of $\triangle ABC$.
Show that:
 i. $\triangle ABE \cong \triangle ACF$,
 ii. AB = AC.

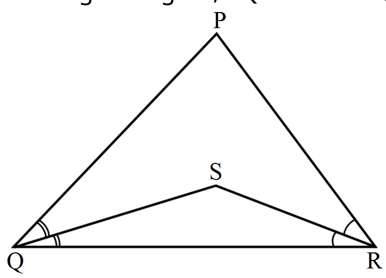


Ans. :

i. In $\triangle ABE$ and $\triangle ACF$,
$\angle AEB = \angle AFC$ (Each 90°)
$BE = CF$ (given)
$\angle BAE = \angle CAF \ (\text{common} \angle A)$
$\therefore \triangle ABE \cong \triangle ACF$ (by ASA congruence criterion)

ii. Since $\triangle ABE \cong \triangle ACF$,
$AB = AC$ (C.P.C.T.)

18. In the given figure, PQ > PR and QS and RS are the bisectors of $\angle Q$ and $\angle R$ respectively. Show that SQ > SR.



Ans. : Since the angle opposite to the longer side is greater, we have:
$PQ > PR$
$\Rightarrow \angle R > \angle Q$
$\Rightarrow \frac{1}{2}\angle R > \angle Q$
$\Rightarrow \angle SRQ > \angle RQS$
$\Rightarrow QS > SR$
$\therefore SQ > SR$

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