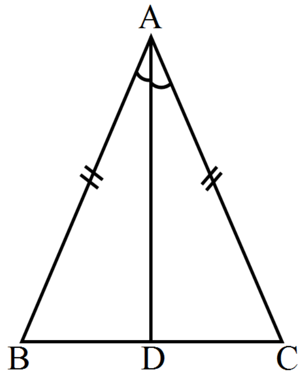
*** Choose the right answer from the given options. [1 Marks Each]** **[10]**

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



(A) ASA (B) SAS (C) SSS (D) AAS

Ans. :

b. SAS

Solution:

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.

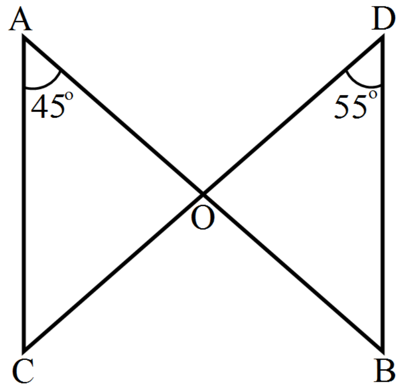
2. Line segments AB and CD intersect at O such that AC || DB. If $\angle CAB = 45^\circ$ and $\angle CDB = 55^\circ$, then $\angle BOD =$

(A) 100° (B) 80° (C) 90° (D) 135°

Ans. :

b. 80°

Solution:



AC || BD

And, AB is transverse to these parallal lines

So $\angle CAB = \angle ABD$ (Alternate angles)

$\Rightarrow \angle ABD = 45^\circ$

Now In $\triangle BOD$

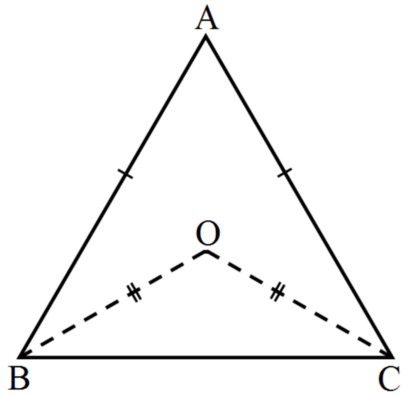
$\angle BOD + \angle ODB + \angle DBA = 180^\circ$

$\angle DBA = \angle ABD = 45^\circ, \angle ODB = 55^\circ$

So $\angle BOD = 180^\circ - 45^\circ - 55^\circ$

$= 80^\circ$

3. In the given figure, AB = AC and OB = OC. Then, $\angle ABO : \angle ACO = ?$



(A) 1 : 1 (B) 2 : 1 (C) 1 : 2 (D) None of these

Ans. :

a. 1 : 1

Solution:

In $\triangle ABC$,

$AB = AC \Rightarrow \angle ABC = \angle ACB \ldots (i)$

In $\triangle OBC$,

$OB = OC \Rightarrow \angle OBC = \angle OCB \ldots (ii)$

Subtraction (ii) from (i), we get

$\Rightarrow \angle ABO = \angle ACO$

So, $\angle ABO : \angle ACO = 1 : 1$

4. In $\triangle PQR$, $\angle P = 60^\circ$, $\angle Q = 50^\circ$. Which side of the triangle is the longest?

(A) PQ (B) QR (C) None (D) PR

Ans. :

a. PQ

Solution:

In $\triangle PQR$, $\angle P = 60^\circ$, $\angle Q = 50^\circ$.

Now, by angle sum property, $\angle P + \angle Q + \angle R = 180^\circ$

$60^\circ + 50^\circ + \angle R = 180^\circ$

or, $\angle R = 180^\circ - 110^\circ = 70^\circ$

So, $\angle R$ is the largest angle and the side opposite to it, i.e, PQ will be the longest side.

5. Side BC of a triangle ABC has been produced to a point D such that $\angle ACD = 120^\circ$. If $\angle B = \frac{1}{2}\angle A$, then $\angle A$ is equal to :

(A) 80° (B) 75° (C) 60° (D) 90°

Ans. :

a. 80°

Solution:

$\angle B = \frac{1}{2}\angle A$

$\angle ACD$ is an exterior angle.

$\Rightarrow \angle A + \angle B = \angle ACD$

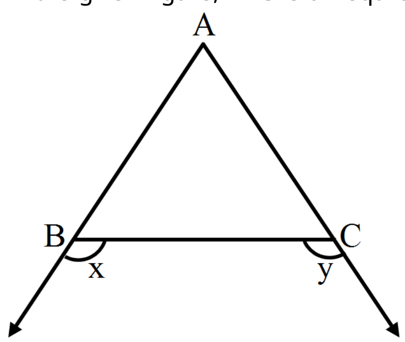
$\Rightarrow \angle A = \frac{1}{2}\angle A = 120^\circ$

$\Rightarrow \frac{3\angle A}{2} = 120^\circ$

$\Rightarrow 3\angle A = 240^\circ$

$\Rightarrow \angle A = 80^\circ$

6. In the given figure, ABC is an equilateral triangle. The value of x + y is:



(A) 120° (B) 180° (C) 240° (D) 200°

Ans. :

c. 240°

Solution:

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

$x = 180 - 60 = 120^{o}$

$y = 180 - 60 = 120^{o}$

$x + y = 120 + 120 = 240^{o}$

7. The perimeter of a triangle is 36cm and its sides are in the ratio a : b : c = 3 : 4 : 5 then a, b, c are respectively:

(A) 9cm, 15cm, 12cm (B) 9cm, 12cm, 15cm (C) 12cm, 9cm, 15cm (D) 15cm, 12cm, 9cm

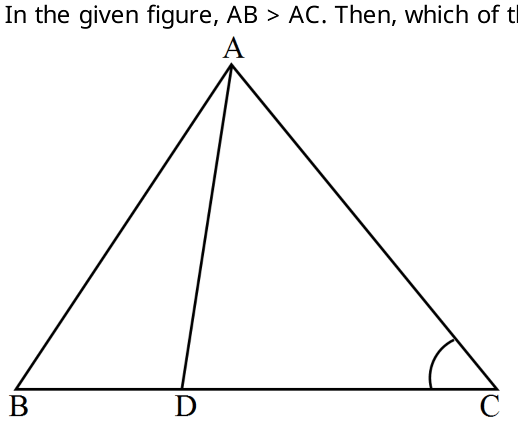
Ans. :

b. 9cm, 12cm, 15cm

Solution:

Let the three sides a, b, c be 3x, 4x and 5x respectively.
Then according to the conditions given in the question, we have
$3x + 4x + 5x = 36$
$12x = 36$
$x = 3cm$
Thus, the three sides are:
$a = 3 \times 3 = 9cm$, $b = 4 \times 3 = 12cm$ and $c = 5 \times 3 = 15cm$

8. In the given figure, AB > AC. Then, which of the following is true?



(A) AB < AD (B) Cannot be determined (C) AB > AD (D) AB = AD

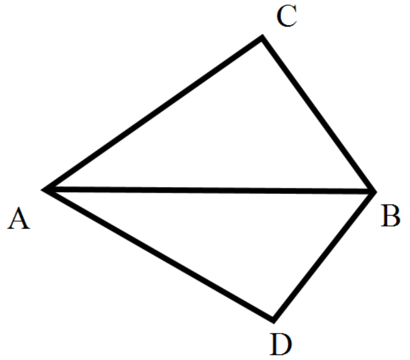
Ans. :

c. AB > AD

Solution:

AB > AC [given.]
$\therefore \angle ACB > \angle ABC$
Now, $\angle ADB > \angle ACD$ (exterior angle is always greater than each interior angle)
$\Rightarrow \angle ADB > \angle ACB > \angle ABC$
$\Rightarrow \ \angle ADB > \angle ADB$
$\Rightarrow AB > AD$

9. In the above quadrilateral ACBD, we have AC= AD and AB bisect the LA .Which of the following is true?



(A) $\triangle ABC \cong \triangle ABD$ (B) $\angle C = \angle D$ (C) All are true (D) $BC = BD$

Ans. :

c. All are true

Solution:

$AC = AD$

$\angle AB = \angle BAD$

$AB = AB$

By SAS, we have

$\triangle ABC \cong \triangle ABD$

Hence, we have $BC = BD$ and $\angle C = \angle D$.

So, all the given options are true.

10. In the following, write the correct answer.

In $\triangle ABC$ if AB = AC and $\angle B = 50^\circ$ then is equal to:

(A) 40° (B) 50° (C) 80° (D) 130°

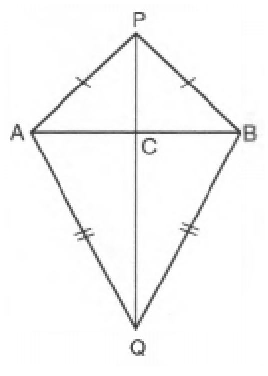
Ans. :

b. 50°

Solution: Given $\triangle ABC$ such that AB = AC and $\angle B = 50^\circ$

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

11. AB is a line segment. P and Q are points on opposite sides of AB such that each of them is equidistant from the points A and B (See Figure). Show that the line PQ is the perpendicular bisector of AB.



Ans. : In △PAQ and △PBQ,

AP = BP (Given)

AQ = BQ (Given)

PQ = PQ (Common)

So, △PAQ ≅ △PBQ (SSS rule)

Therefore, ∠APQ = ∠BPQ (CPCT).

Now let us consider △PAC and △PBC.

You have: AP = BP (Given)

∠APC = ∠BPC (∠APQ = ∠BPQ proved above)

PC = PC (Common)

So, △PAC ≅ △PBC (SAS rule)

Therefore, AC = BC (CPCT) ....(i)

∠ACP = ∠BCP (CPCT)

and ∠ACP + ∠BCP = 180° (Linear pair)

So, $2\angle ACP$= 180°

Or, ∠ACP = 90° ......(ii)

From (i) and (ii), we can easily conclude that PQ is the perpendicular bisector of AB.

12. In $\triangle PQR, \angle P = 70^\circ$ and $\angle R = 30^\circ$. Which side of this triangle is the longest? Give reason for your answer.

Ans. : In $\triangle PQR$, we have

$\angle Q = 180^\circ - (\angle P + \angle R)$

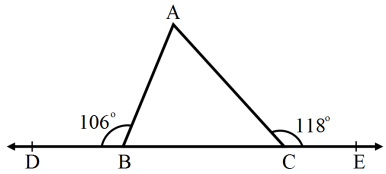
$= 180^\circ - (70^\circ + 30^\circ) = 180^\circ - 100^\circ$

$= 80^\circ$

Now, in the larger and side opposite to greater angle is loger.

Hence, PR is the longest side.

13. In the given figure, the side BC of $\triangle ABC$ has been produced on both sides-on the left to D and on the right to E. If $\angle ABD = 106^\circ$ and $\angle ACE = 118^\circ$, find the measure of each angle of the triangle.



Ans. : As $\angle DBA$ and $\angle ABC$ form a linear pair.

So, $\angle DBA + \angle ABC = 180^\circ$

$\Rightarrow 106^\circ + \angle ABC = 180^\circ$

$\Rightarrow \angle ABC = 180^\circ - 106^\circ = 74^\circ$

Also, $\angle ACB$ and $\angle ACE$ form a linear pair.

So, $\angle ACB + \angle ACE = 180^\circ$

$\Rightarrow \angle ACB + 118^\circ = 180^\circ$

$\Rightarrow \angle ACB = 180^\circ - 118^\circ = 62^\circ$

In $\triangle ABC$, we have,

$\angle ABC + \angle ACB + \angle BAC = 180^\circ$

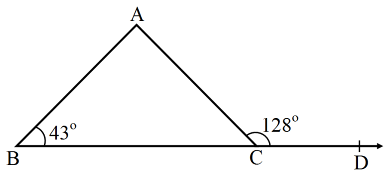
$74^\circ + 62^\circ + \angle BAC = 180^\circ$

$\Rightarrow 136^\circ + \angle BAC = 180^\circ$

$\Rightarrow \angle BAC = 180^\circ - 136^\circ = 44^\circ$

$\therefore$ In triangle ABC, $\angle A = 44^\circ, \angle B = 74^\circ$ and $\angle C = 62^\circ$

14. In the given figure, side BC of $\triangle ABC$ is produced to D. If $\angle ACD = 128^\circ$ and $\angle ABC = 43^\circ$, find $\angle BAC$ and $\angle ACB$.



Ans. : Since $\angle ACB$ and $\angle ACD$ form a linear pair.

So, $\angle ACB + \angle ACD = 180^\circ$

$\Rightarrow \angle ACB + 128^\circ = 180^\circ$

$\Rightarrow \angle ACB = 180^\circ - 128 = 52^\circ$

Also, $\angle ABC + \angle ACB + \angle BAC = 180^\circ$

$\Rightarrow 43^\circ + 52^\circ + \angle BAC = 180^\circ$

$\Rightarrow 95^\circ + \angle BAC = 180^\circ$

$\Rightarrow \angle BAC = 180^\circ - 95^\circ = 85^\circ$

$\therefore \angle ACB = 52^\circ$ and $\angle BAC = 85^\circ$.

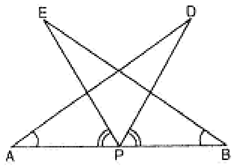
*** Answer the following questions. [3 Marks Each]** **[12]**

15. AB is a line segment and P is its mid-point. D and E are points on the same side of AB such that ∠BAD = ∠ABE and ∠EPA = ∠DPB.

Show that:

i. △DAP ≅ △EBP

ii. AD = BE



Ans. : Given: AB is a line segment and P is its mid-point. D and E are points on the same side of AB such that ∠BAD = ∠ABE and ∠EPA = ∠DPB.

To prove:

i. DDAP ≅ DEBP

ii. AD = BE

Proof :(ii)

∠EPA = ∠DPB ...[Given]

∠EPA + ∠EPD = ∠EPD + ∠DPB ...[Adding ∠EPD to both sides]

∠APD = ∠BPE ...(1)

In DDAP and DEBP

∠DAP = ∠EBP ...[Given]

AP = BP ...[As P is the mid-point of the line AB]

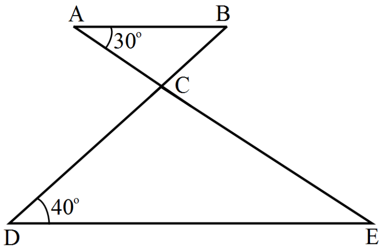
∠APD = ∠BPE ...[From (1)]

∴ DDAP ≅ DEBP proved ...[ASA property] ...(2)

(i) As DDAP ≅ DEBP ...[From (2)]

∴ AD = BE ...[c.p.c.t.]

16. In Fig. AB || DE Find $\angle ACD$.



Ans. : Since AB || DE

$\therefore \angle ABC = \angle CDE = 40^\circ$ [Alternate angles]

$\therefore \angle ACB = 180^\circ - \angle ABC - \angle BAC$

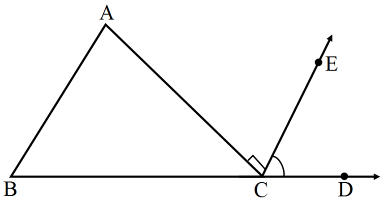
$= 180^\circ - 40^\circ - 30^\circ$

$= 110^\circ$

$\therefore \angle ACD = 180^\circ - 110^\circ$ [Linear pair]

$= 70^\circ$

17. In Fig. $AC \perp CE$ and $\angle A : \angle B : \angle C = 3:2:1$, find the value of $\angle ECD$.



Ans. : $\angle A : \angle B : \angle C = 3:2:1$

Let the angles be 3x, 2x and x

⇒ 3x + 2x + x = 180° [Angle sum property]

⇒ 6x = 180°

⇒ $x = 30 = \angle ACB$

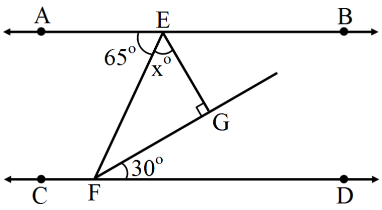
$\therefore \angle ECD = 180^\circ - \angle ACB - 90^\circ$ ° [Linear pair]

$= 180^\circ - 30^\circ - 90^\circ$

$= 60^\circ$

$\therefore \angle ECD = 60^\circ$

18. In the given figure, AB || CD and EF is a transversal. If $\angle AEF = 65^\circ, \angle DFG = 30^\circ, \angle EFG = 90^\circ$



and $\angle GEF = x^\circ$, find the value of x.

Ans. : AB || CD and EF is the transversal.

$\Rightarrow \angle AEF = \angle EFD$ (alternate angles)

$\Rightarrow \angle AEF = \angle EFG + \angle DFG$

$\Rightarrow 65^\circ = \angle EFG + 30^\circ$

$\Rightarrow \angle EFG = 35^\circ$

In $\triangle GEF$, by angle sum property,

$\angle GEF + \angle EGF + \angle EFG = 180^\circ$

$\Rightarrow x + 90^\circ + 35^\circ = 180^\circ$

$\Rightarrow x = 55^\circ$

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