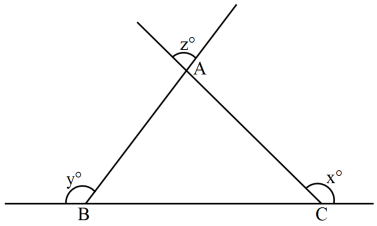
KD EDUCATION ACADEMY [9582701166]

Time : 6 hour | STD 9 Maths | Total Marks : 300

kd sir 90+ Questions ch-7 triangle

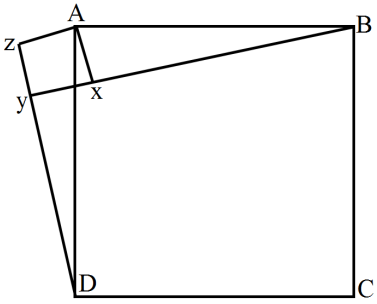
*** Choose the right answer from the given options. [1 Marks Each]** **[73]**

1. In figure, what is z in terms of x and y?



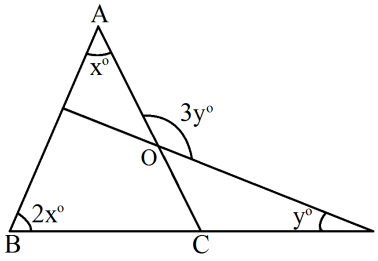
(A) 180º - (x + y) (B) x + y + 180º (C) x + y + 360º (D) x + y - 180º

2. In figure, X is a point in the interior of square ABCD. AXYZ is also a square. If DY = 3cm and AZ = 2cm, then BY =



(A) 6cm (B) 7cm (C) 8cm (D) 5cm

3. In Fig. what is y in terms of x?

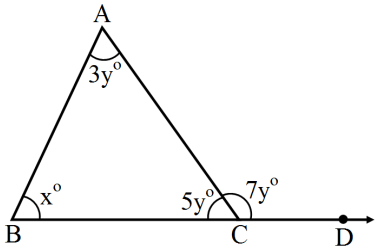


(A) $\frac{3}{2}x^\circ$ (B) $\frac{4}{3}x^\circ$ (C) x° (D) $\frac{3}{4}x^\circ$

4. In a $\triangle ABC$, if $\angle A = 60^\circ$, $\angle B = 80^\circ$ and the bisectors of $\angle B$ and $\angle C$ meet at O, the $\angle BOC =$

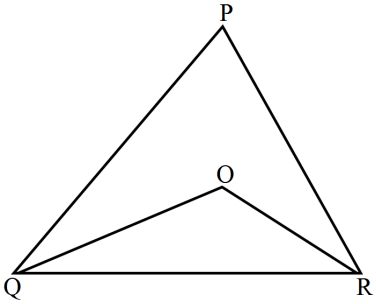
(A) 120º (B) 150º (C) 30º (D) 60º

5. In the given figure, side BC of $\triangle ABC$ has been produced to a point D. If $\angle A = 3y, \angle B = x^\circ, \angle C = 5y^\circ$ and $\angle CBD = 7y^\circ$. Then, the value of x is:



(A) 60 (B) 50 (C) 45 (D) 35

6. In the adjoining figure, PQ > PR. If OQ and OR are bisectors of $\angle Q$ and $\angle R$ respectively, then



(A) OQ > OR (B) OQ < OR (C) OQ ≤ OR (D) OQ = OR

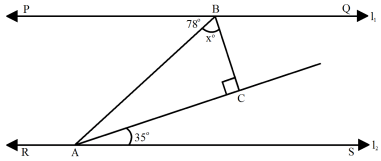
7. An angle is 14º more than its complement. Find its measure.

(A) 52º (B) 62º (C) 32º (D) 42º

8. 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:

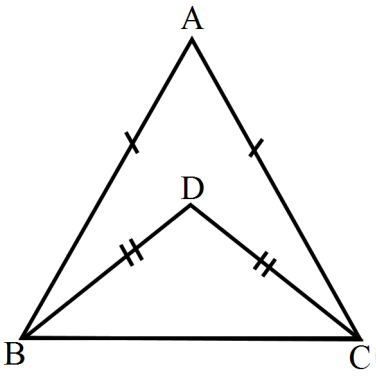
(A) 9cm, 15cm, 12cm (B) 9cm, 12cm, 15cm (C) 12cm, 9cm, 15cm (D) 15cm, 12cm, 9cm

9. In Fig. for which value of x is $l_1 \parallel l_2$?



(A) 37º (B) 43º (C) 45º (D) 47º

10. In the adjoining Figure, AB = AC and BO = CD. The ratio $\angle ABO : \angle ACD$ is:

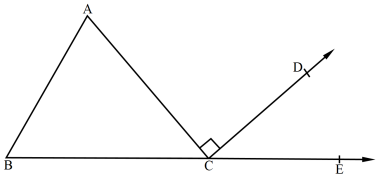


(A) It is 1 : 1 (B) It is 1 : 2 (C) It is 2 : 3 (D) It is 2 : 1

11. In $\triangle ABC$, if $\angle A = 100^\circ$, AD bisects $\angle A$ and $AD \perp BC$. Then, $\angle B =$

(A) 50º (B) 90º (C) 40º (D) 100º

12. In a $\angle ABC$, it is given that $\angle A : \angle B : \angle C = 3 : 2 : 1$ and $\angle ACD = 90^\circ$. If BC is produced to E then $\angle ECD =?$

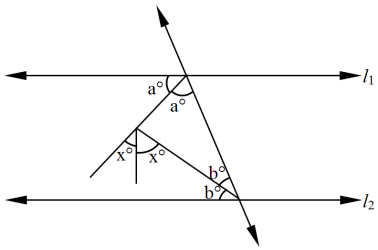


(A) 60º (B) 50º (C) 25º (D) 40º

13. In a $\triangle ABC$, if $\angle A - \angle B = 42^\circ$ and $\angle B - \angle C = 21^\circ$ then $\angle B =?$

(A) 63º (B) 32º (C) 95º (D) 53º

14. In Figure, if $l_1 || l_2$, the value of x is:



(A) 60 (B) $22\frac{1}{2}$ (C) 45 (D) 30

15. In the following, write the correct answer.

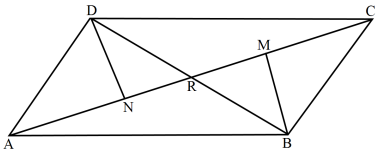
Two sides of a triangle are of lengths 5cm and 1.5cm. The length of the third side of the triangle cannot be:

(A) 3.6cm (B) 4.1cm (C) 3.8cm (D) 3.4cm

16. In $\triangle ABC$ and $\triangle DEF$ its is given that $\angle B = \angle E$ and $\angle C = \angle F$ in order that $\triangle ABC \cong \triangle DEF$ we must have,

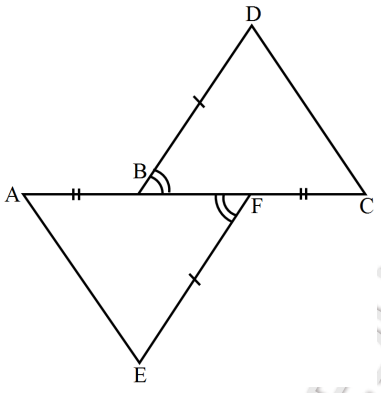
(A) AC = DE (B) BC = EF (C) AB = DF (D) $\angle A = \angle D$

17. In quadrilateral ABCD, BM and DN are drawn perpendiculars to AC such that BM = DN. If BR = 8cm. then BD is:



(A) 12cm (B) 2cm (C) 16cm (D) 4cm

18. In the adjoining figure, AB = FC, EF = BD and $\angle AFE = \angle CBD$. Then the rule by which $\triangle AFE \cong \triangle CBD$.

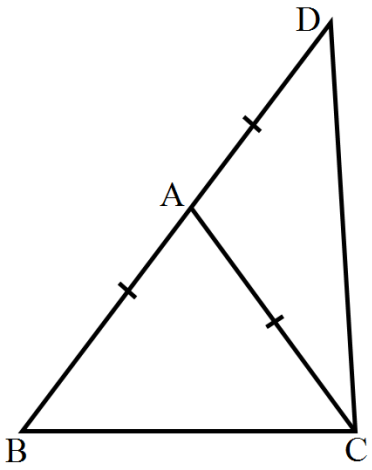


(A) SAS (B) AAS (C) SSS (D) ASA

19. In a $\triangle ABC$, if $AB = AC$ and BC is produced to D such that $\angle ACD = 100^\circ$ then $\angle A =$

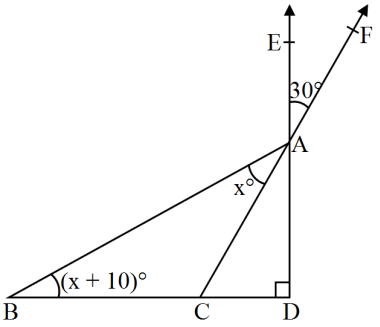
(A) 20° (B) 40° (C) 60° (D) 80°

20. In an isosceles, $\triangle ABC$, AB = AC and side BA is produced to D such that AB = AD. Then the measure of $\angle BCD$ is:



(A) 70º (B) 90º (C) 100º (D) 60º

21. In the given figure, $\mathrm{EAD} \perp \mathrm{BCD}$. Ray FAC cuts ray EAD at a point A such that $\angle \mathrm{EAF} = 30^\circ$. Also, in $\triangle \mathrm{BAC}$, $\angle \mathrm{BAC} = \mathrm{x}^\circ$ and $\angle \mathrm{ABC} = (\mathrm{x} + 10)^\circ$. Then, the value of x is:



(A) 30 (B) 20 (C) 35 (D) 25

22. If the measure of angles of a triangle are in the ratio of 3 : 4 : 5, what is the measure of the smallest angle of the triangle?

(A) 25º (B) 30º (C) 45º (D) 60º

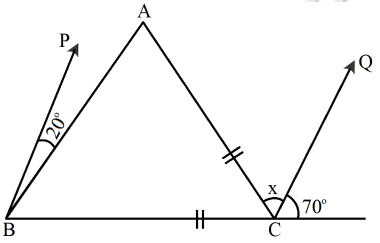
23. In triangles ABC and PQR three equality relation between some parts are as follows:
$\mathrm{AB} = \mathrm{QP}, \angle \mathrm{B} = \angle \mathrm{P}$ and $\mathrm{BC} = \mathrm{PR}$
State which of the congruence conditions applies:

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

24. In an isosceles $\triangle \mathrm{ABC}$, if AB = AC and $\angle \mathrm{A} = 90^\circ$, Find $\angle \mathrm{B}$.

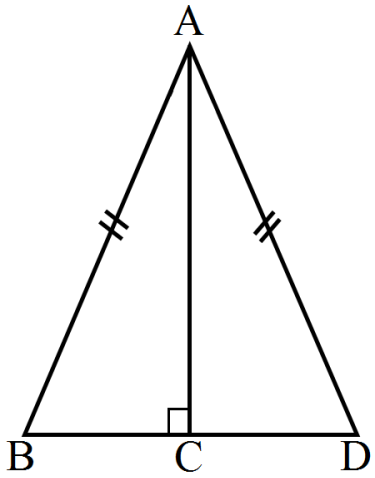
(A) 60° (B) 80° (C) 45° (D) 95°

25. In Fig. if BP || CQ and AC = BC, then the measure of x is:



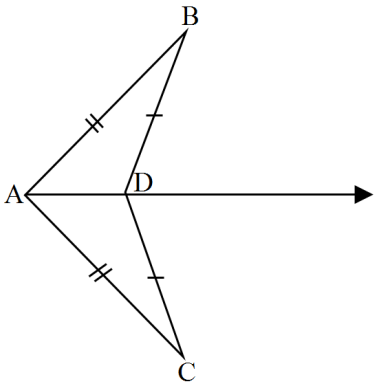
(A) 20º (B) 25º (C) 30º (D) 35º

26. In the adjoining figure, AB = AC and $\mathrm{AD} \perp \mathrm{BC}$. The rule by which $\triangle \mathrm{ABD} \cong \triangle \mathrm{ACD}$ is:



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

27. In fig., $\triangle ABD \cong \triangle ACD$, AB = AC, BD = DC name the criteria by which the triangles are congruent:

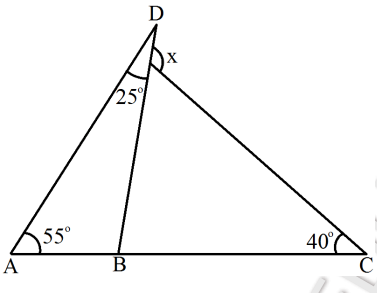


(A) SSS (B) ASA (C) RHS (D) SAS

28. In a $\triangle ABC$, if $3\angle A = 4\angle B = 6\angle C$ then A : B : C = ?

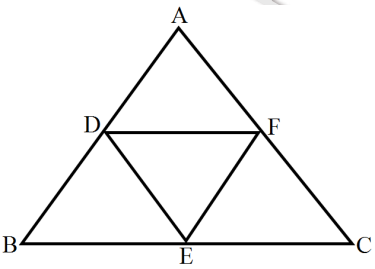
(A) 4 : 3 : 2 (B) 6 : 4 : 3 (C) 2 : 3 : 4 (D) 3 : 4 : 6

29. In Fig the value of x is:



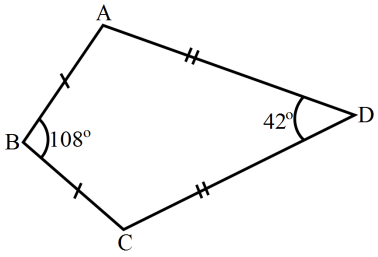
(A) 65º (B) 80º (C) 95º (D) 120º

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

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



(A) 30º (B) 105º (C) 150º (D) 72º

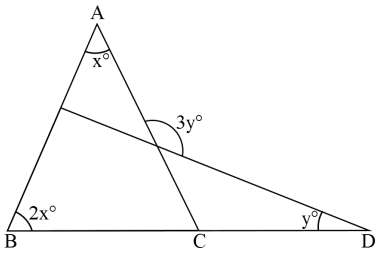
32. In an isosceles triangle, if the vertex angle is twice the sum of the base angles, then the measure of vertex angle of the triangle is:

(A) 100º (B) 120º (C) 110º (D) 130º

33. In $\triangle ABC$, if $\angle A = 45^\circ$ and $\angle B = 70^\circ$, then the shortest and the longest sides of the triangle are _____ .

(A) BC, AB (B) BC, AC (C) AB, BC (D) AB, AC

34. In figure, what is Y in terms of X?



(A) $\frac{3}{2}X^\circ$ (B) $\frac{3}{4}X^\circ$ (C) $\frac{4}{3}X^\circ$ (D) X

35. The cost of turfing a triangular field at the rate of Rs. 45 per 100m^2 is Rs. 900. If the double the base of the triangle is 5 times its height, then its height is:

(A) 42cm (B) 32cm (C) 44cm (D) 40cm

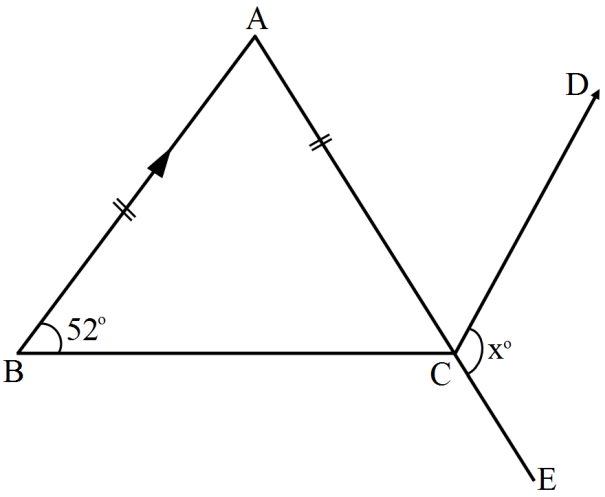
36. If ABC and DEF are two triangles such that $\triangle ABC \cong \triangle FDE$ and $AB = 5m, \angle B = 40^\circ$ and $\angle A = 80^\circ$. Then, which of the following is true?

(A) $DF = 5cm, \angle F = 60^\circ$ (B) $DE = 5cm, \angle E = 60^\circ$ (C) $DF = 5cm, \angle E = 60^\circ$ (D) $DE = 5cm, \angle D = 40^\circ$

37. An exterior angle of a triangle is 108º and its interior opposite angles are in the ratio 4 : 5 The angles of the triangle are:

(A) 48º, 60º, 72º (B) 50º, 60º, 70º (C) 52º, 56º, 72º (D) 42º, 60º, 76º

38. In Fig. ABC ids an isosceles triangle whose side AC is produced to E. Through C, CD is drawn parallel to BA. The value of x is:

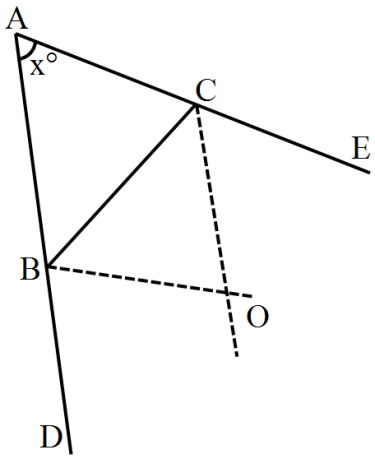


(A) 52º (B) 76º (C) 156º (D) 104º

39. In a $\triangle ABC$, if $3\angle A = 4\angle B = 6\angle C$ then A : B : C =?

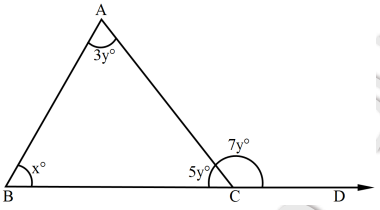
(A) 3 : 4 : 6 (B) 4 : 3 : 2 (C) 2 : 3 : 4 (D) 6 : 4 : 3

40. The bisector of exterior angles at B and C of $\triangle ABC$ meet at O. If $\angle A = x^\circ$, then $\angle BOC$.



(A) $90^\circ - \frac{x^\circ}{2}$ (B) $180^\circ + \frac{x^\circ}{2}$ (C) $90^\circ + \frac{x^\circ}{2}$ (D) $180^\circ - \frac{x^\circ}{2}$

41. In the given figure, side BC of $\triangle ABC$ has been produced to a point D. If $\angle A = 3y^\circ \angle B = x^\circ$, $\angle C = 5y^\circ$ and $\angle CBD = 7y^\circ$. Then, the value of x is:

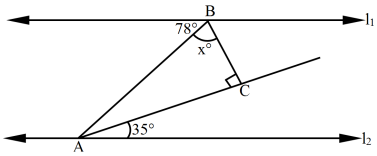


(A) 60 (B) 45 (C) 50 (D) 35

42. In $\triangle ABC, \angle B = \angle C$ and ray AX bisects the exterior angle $\angle DAC$. If $\angle DAX = 70^\circ$ then $\angle ACB =$

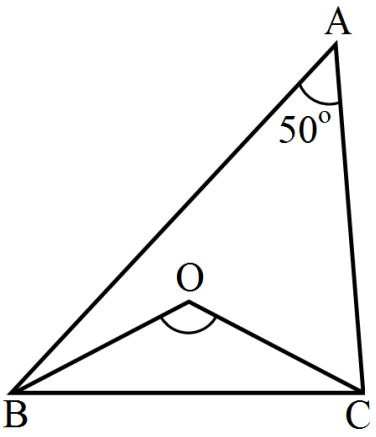
(A) 35º (B) 90º (C) 70º (D) 55º

43. In figure, for which value of x is $11 || 12$?



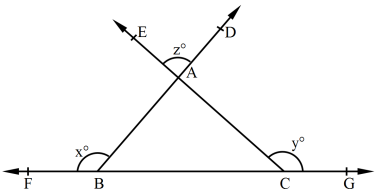
(A) 45 (B) 47 (C) 43 (D) 37

44. In the given figure, BO and CO are bisectors of $\angle B$ and $\angle C$ respectively. If $\angle A = 50^\circ$ then $\angle BOC = ?$



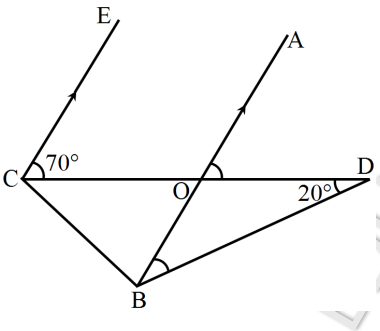
(A) 130º (B) 100º (C) 115º (D) 120º

45. In the given figure, two rays BD and CE intersect at a point A. The side BC of $\triangle ABC$ have been produced on both sides to points F and G respectively. If $\angle ABF = x^\circ,\ \angle ACG = y^\circ$ and $\angle DAE = z^\circ$ then $z = ?$



(A) x + y + 180 (B) 180 - (x + y) (C) x + y - 180 (D) x + y + 360º

46. In Figure, if $EC \parallel AB, \angle ECD = 70^\circ$ and $\angle BDO = 20^\circ$, then $\angle OBD$ is:



(A) 60° (B) 70° (C) 20° (D) 50°

47. In a $\triangle ABC$, if $\angle A = 60^\circ, \angle B = 80^\circ$ and the bisectors of $\angle B$ and $\angle C$ meet at O, then $\angle BOC =$

(A) 60º (B) 120º (C) 150º (D) 30º

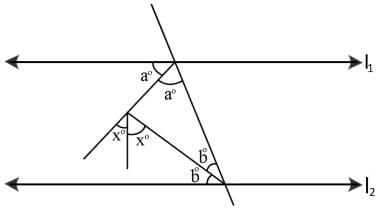
48. The base BC of triangle ABC is produced both ways and the measure of exterior angles formed are 94º and 126º. Then, $\angle BAC =$

(A) 54º (B) 94º (C) 44º (D) 40º

49. In $\triangle ABC$, $BC = AB$ and $\angle B = 80^\circ$. Then, $\angle A = ?$

(A) 50° (B) 40° (C) 100° (D) 80°

50. In Fig. if l_1 || l_2, the value of x is:

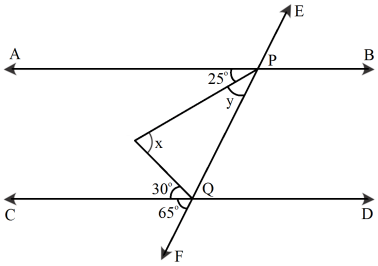


(A) $22\frac{1}{2}$ (B) 30 (C) 45 (D) 60

51. In Fig. ABC is a triangle in which $\angle B = 2\angle C$. D is a point on side BC such that AD bisects $\angle BAC$ and $AB = CD$. Be is the bisector of $\angle B$. The measure of $\angle BAC$ is:

(A) 72º (B) 95º (C) 73º (D) 74º

52. In Fig. AB and CD are parallel lines and transversal EF intersect them at P and Q respectively. If $\angle APR = 25^\circ$, $\angle RQC = 30^\circ$ and $\angle CQF = 65^\circ$, then:



(A) x = 55º, y = 40º (B) x = 50º, y = 45º (C) x = 60º, y = 35º (D) x = 35º, y = 60º

53. If $\triangle PQR \equiv \triangle EFD$, then $\angle E =$

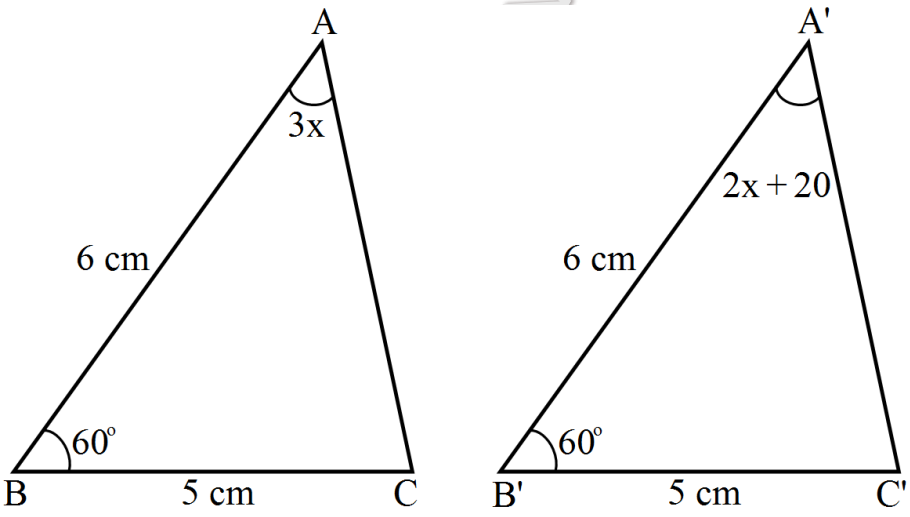
(A) $\angle Q$ (B) $\angle R$ (C) None of these (D) $\angle P$

54. In the following, write the correct answer.

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

(A) 4cm (B) 5cm (C) 2cm (D) 2.5cm

55. In Fig. The measure of $\angle B'A'C'$ is:

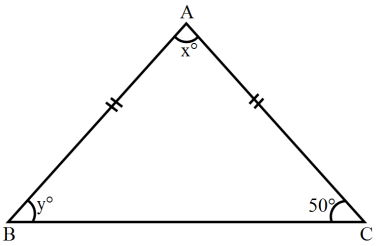


(A) 50º (B) 60º (C) 70º (D) 80°

56. The area of a right angled triangle is $20m^2$ and one of the sides containing the right triangle is 4cm. Then the altitude on the hypotenuse is:

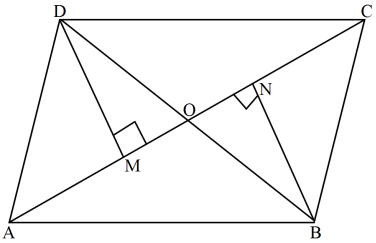
(A) $8cm$ (B) $10cm$ (C) $\frac{20}{\sqrt{29}}cm$ (D) $\frac{10}{\sqrt{41}}cm$

57. In the adjoining fig. AB = AC. If $\angle C = 50^\circ$, then the value of x and y are:



(A) x = 50º and y = 80º (B) x = 60º and y = 70º (C) x = 70º and y = 60º (D) x = 80º and y = 50º

58. In the adjoining figure, ABCD is a quadrilateral in which BN and DM are drawn perpendiculars to AC such that BN = DM. If OB = 4cm. then BD is:

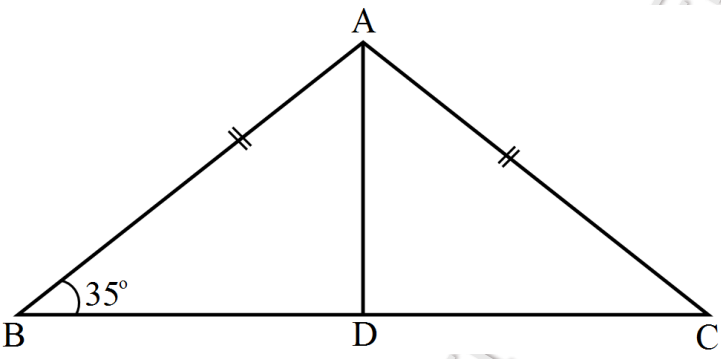


(A) 6cm (B) 8cm (C) 10cm (D) 12cm

59. In $\triangle ABC$, $AB=AC$ and $\angle B = 50^\circ$. Then $\angle A = ?$.

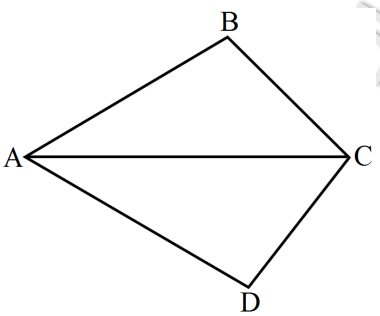
(A) 40 (B) 50 (C) 130 (D) 80

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



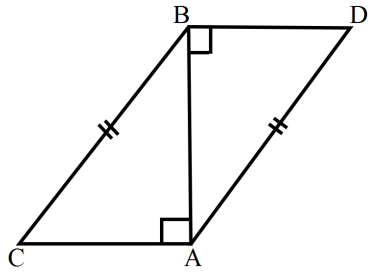
(A) 55° (B) 70° (C) 35° (D) 110°

61. In the adjoining figure, $\triangle ABC \cong \triangle ADC$. If $\angle BAC = 30^\circ$ and $\angle ABC = 100^\circ$ then $\angle ACD$ is equal to:



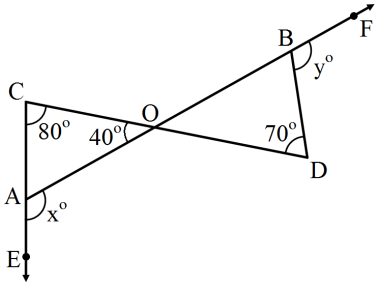
(A) 80º (B) 60º (C) 30º (D) 50º

62. 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

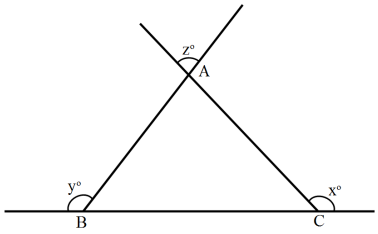
63. In the given figure, lines AB and CD intersect at a point O. The sides CA and OB have been produced to E and repectively such that $\angle \mathrm{OAE} = \mathrm{x}^\circ$ and $\angle \mathrm{DBF} = \mathrm{y}^\circ$.



If $\angle \mathrm{OCA} = 80^\circ, \angle \mathrm{COA} = 40^\circ$ and $\angle \mathrm{BDO} = 70^\circ$ then $\mathrm{x}^\circ + \mathrm{y}^\circ = ?$

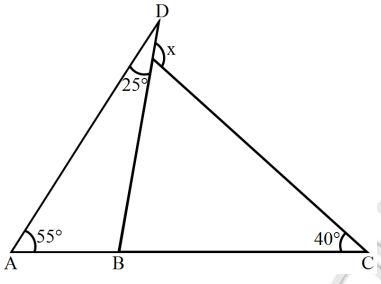
(A) 190º (B) 230º (C) 210º (D) 270º

64. In Fig. what is z in terms of x and y?



(A) x + y + 180º (B) x + y - 180º (C) 180º - (x + y) (D) x + y + 360º

65. In figure, the value of x is:



(A) 95º (B) 65º (C) 120º (D) 80º

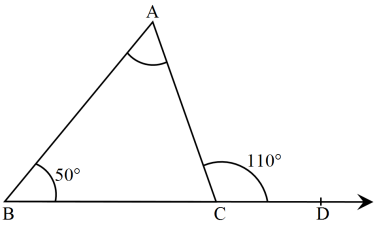
66. The base BC of triangle ABC is produced both ways and the measure of exterior angles formed are 94º and 126º. Then, $\angle \mathrm{BAC} =$

(A) 94º (B) 54º (C) 40º (D) 44º

67. Side BC of a triangle ABC has been produced to a point D such that $\angle \mathrm{ACD} = 120^\circ$ If $\angle \mathrm{B} = 12\angle \mathrm{A}$, then $\angle \mathrm{A}$ is equal to:

(A) 80º (B) 90º (C) 75º (D) 60º

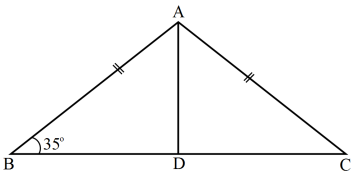
68. In a $\triangle \mathrm{ABC}$, side BC is produced to D. If $\mathrm{ABC} = 50^\circ$ and $\angle \mathrm{ACD} = 110^\circ$ then $\angle \mathrm{A} = ?$



(A) 160° (B) 60° (C) 30° (D) 80°

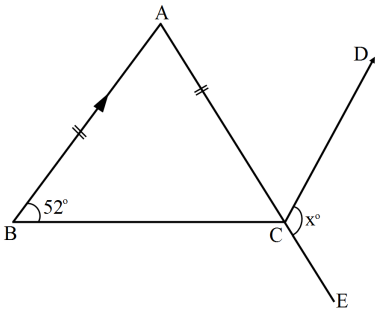
69. ABC is an isosceles triangle such that AB = AC and AD is the median to base BC. Then, $\angle BAD =$

a. 55°
b. 70°
c. 35°
d. 110°



70. In Fig. ABC ids an isosceles triangle whose side AC is produced to E. Through C, CD is drawn parallel to BA. The value of x is:

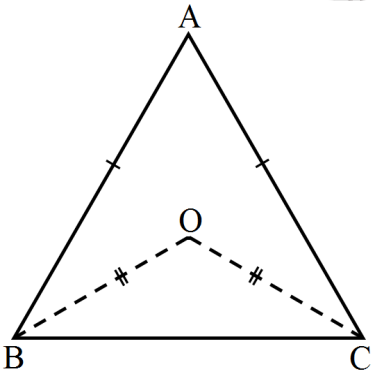
a. 52º
b. 76º
c. 156º
d. 104º



71. In $\triangle ABC$, $\angle A = 40^\circ$ and $\angle B = 60^\circ$. Then the longest side of $\triangle ABC$ is:

a. BC
b. AC
c. AB
d. cannot be determined

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



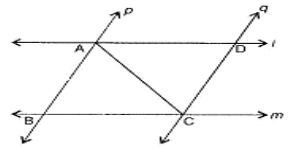
a. 1 : 1

b. 2 : 1
c. 1 : 2
d. None of these

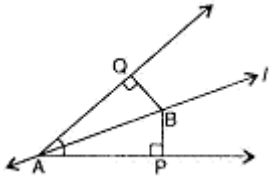
73. In $\triangle ABC$, $BC = AB$ and $\angle B = 80^\circ$. Then, $\angle A = ?$
a. 50°
b. 40°
c. 100°
d. 80°

*** Answer the following questions in one sentence. [1 Marks Each]** **[5]**

74. l and m are two parallel lines intersected by another pair of parallel lines p and q. Show that $\Delta ABC \cong \Delta CDA$.

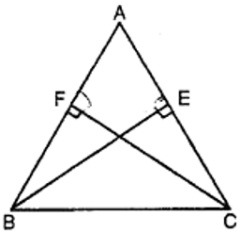


75. Line l is the bisector of an angle $\angle A$ and B is any point on l. BP and BQ are perpendicular from B to the arms of $\angle A$.



Show that:
i. $\triangle APB \cong \triangle AQB$
ii. BP = BQ or B is equidistant from the arms of $\angle A$.

76. 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.

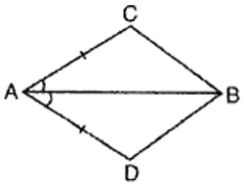


77. Is it possible to construct a triangle with lengths of its sides as given below? Give reason for your answer.
2.5cm, 5cm, 7cm

78. Is it possible to construct a triangle with lengths of its sides as given below? Give reason for your answer.
3cm, 4cm, 8cm

*** Answer the following short questions. [2 Marks Each]** **[28]**

79. 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?

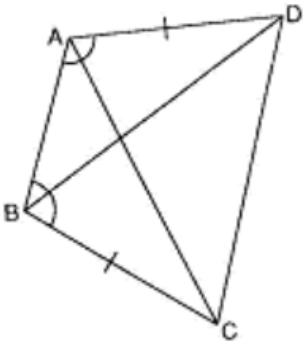


80. ABCD is a quadrilateral in which AD = BC and ∠DAB = ∠CBA : Prove that:

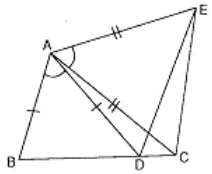
i. △ ABD ≅ △ BAC

ii. BD = AC

iii. ∠ ABD= ∠ BAC



81. In figure, AC = AE, AB = AD and ∠BAD = ∠EAC. Show that BC = DE.

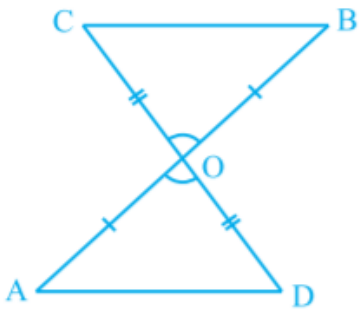


82. ABC is an isosceles triangle with AB = AC. Draw AP ⊥ BC to show that ∠B = ∠C.

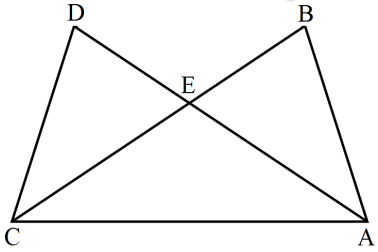
83. In Fig., OA = OB and OD = OC. Show that

i. △ AOD ≅ △ BOC

ii. AD || BC



84. In Fig. it is given that $\mathrm{AB} = \mathrm{CD}$ and $\mathrm{AD} = \mathrm{BC}$. Prove that $\triangle \mathrm{ADC} \cong \triangle \mathrm{CBA}$.



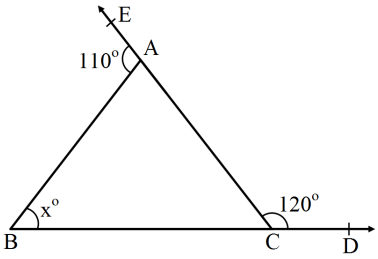
85.

In two triangles ABC and DEF, it is given that $\angle A = \angle D, \angle B = \angle E$ and $\angle C = \angle F$, Are the two triangles necessarily congruent?

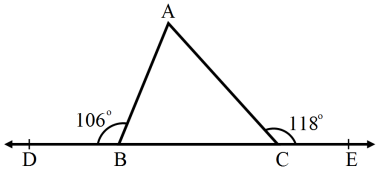
86. In $\triangle ABC$, $\angle A = 100^\circ$ and $\angle C = 50^\circ$. Which is its shortest side?

87. In $\triangle ABC$, $\angle A = \angle B = 45^\circ$. Which is its longest side?

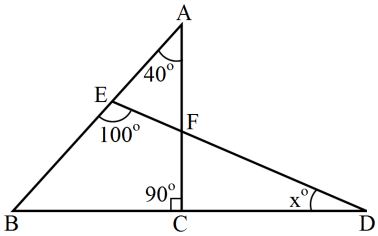
88. Calculate the value of x in the following figures.



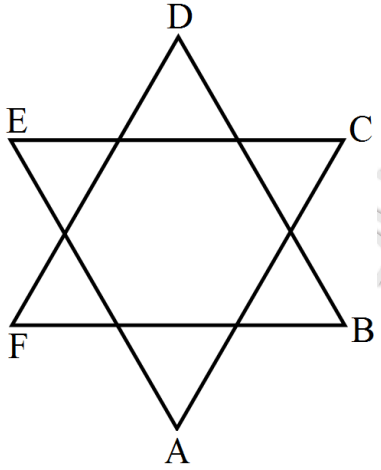
89. In the given figure, the side BC of $\triangle ABC$ has been produced on both sides-on the left to D and on the right to E. If $\angle ABD = 106^\circ$ and $\angle ACE = 118^\circ$, find the measure of each angle of the triangle.



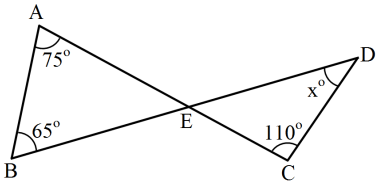
90. Calculate the value of x in the following figures.



91. In the adjoining figure, show that $\angle A + \angle B + \angle C + \angle D + \angle E + \angle F = 360^\circ$.

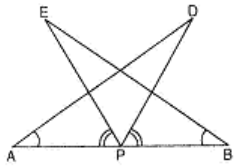


92. Calculate the value of x in the following figures.

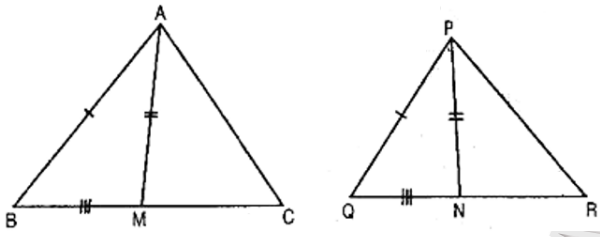


*** Answer the following questions. [3 Marks Each]** **[42]**

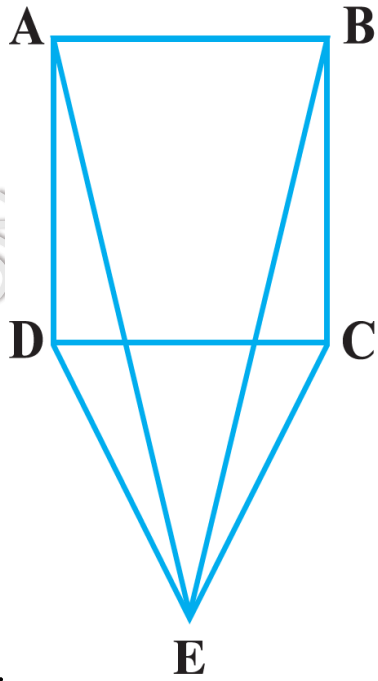
93. AB is a line segment and P is its mid-point. D and E are points on the same side of AB such that ∠BAD = ∠ABE and ∠EPA = ∠DPB.
Show that:
    i. △DAP ≅ △EBP
    ii. AD = BE



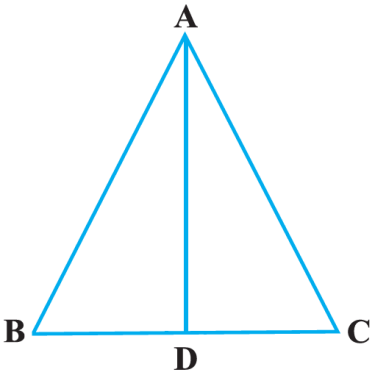
94. Two sides AB and BC and median AM of the triangle ABC are respectively equal to side PQ and QR and median PN of PQR (See figure). Show that:
    i. $\triangle ABM \cong \triangle PQN$
    ii. $\triangle ABC \cong \triangle PQR$



95. In the given figure $\triangle CDE$ is an equilateral triangle formed on a side CD of a square ABCD. Show that $\triangle ADE \cong \triangle BCE$.



96. ABC is an isosceles triangle with AB = AC and D is a point on BC such that $AD \perp BC$ (see figure). To prove that $\angle BAD = \angle CAD$, a student proceeded as



follows: In $\triangle ABD$ and $\triangle ACD$,

$AB = AC$

$\angle B = \angle C$

$\angle ADM = \angle ADC$

$\therefore \triangle ABD \cong \triangle ADC$

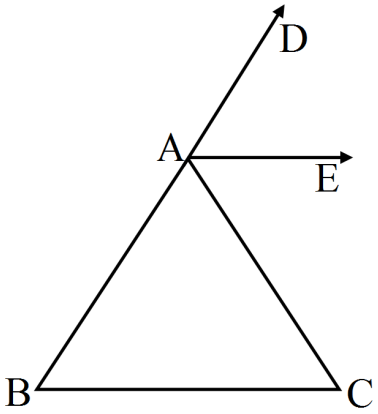
$\angle BAD = \angle CAD$

What is the defect in the above arguments?

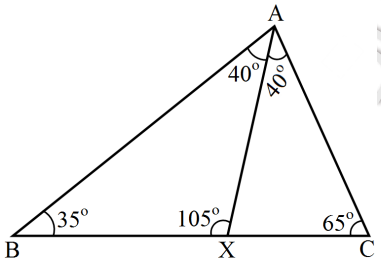
97. In a $\triangle ABC$, $BD \perp AC$ and $CE \perp AB$. If BD and CE intersect O, prove that $\angle BOC = 180^\circ - A$.

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

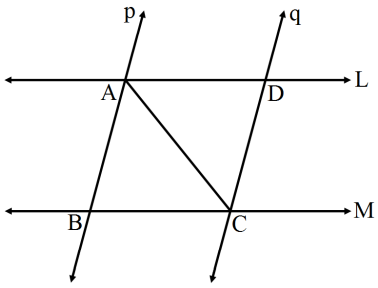
99. In figure AE bisects $\angle CAD$ and $\angle B = \angle C$. Prove that AE || BC.



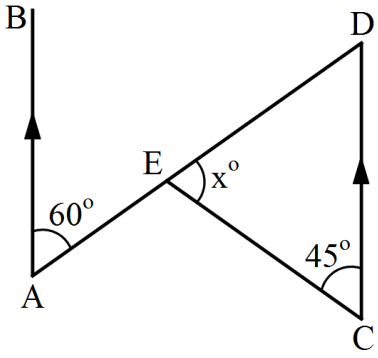
100. In $\triangle ABC$, $\angle B = 35^\circ, \angle C = 65^\circ$ and the bisector of $\angle BAC$ meets BC in X. Arrange AX, BX and CX in descending order.



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

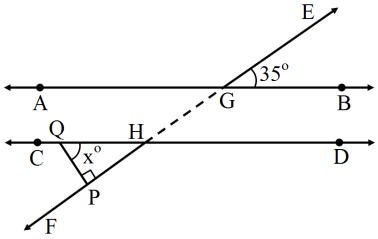


102. Calculate the value of x in the following figures.



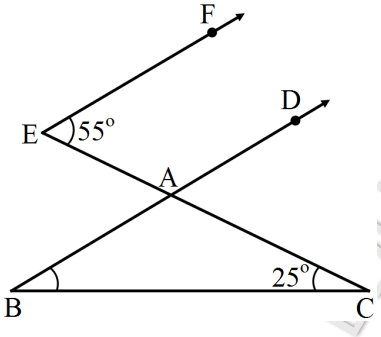
103. In $\triangle ABC$, if $\angle A + \angle B = 125^\circ$ and $\angle A + \angle C = 113^\circ$, find $\angle A$, $\angle B$ and $\angle C$.

104. In the given figure, AB || CD and EF is a transversal, cutting them at G and H respectively. If $\angle EGB = 35^\circ$ and $QP \perp EF$, find the measure of $\angle PQH$.



105. In $\triangle ABC$, if $\angle A + \angle B = 108^\circ$ and $\angle B + \angle C = 130^\circ$, find $\angle A$, $\angle B$ and $\angle C$.

106. In the given figure, BAD || EF, $\angle AEF = 55^\circ$ and $\angle ACB = 25^\circ$, find $\angle ABC$.



* Questions with calculation. [4 Marks Each] [80]

107. In a right triangle, prove that the line-segment joining the mid-point of the hypotenuse to the opposite vertex is half the hypotenuse.

108. ABC is a right triangle with AB = AC. If bisector of meets BC at D,then prove that BC = 2AD.

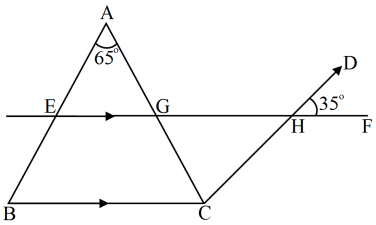
109. Show that in a quadrilateral ABCD, AB + BC + CD + DA < 2 (BD + AC)

110. Prove that sum of any two sides of a triangle is greater than twice the median with respect to the third side.

111. S is any point on side QR of a $\triangle PQR$. show that PQ + QR + RP > 2PS.

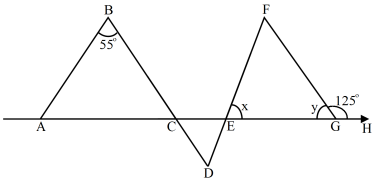
112. In a triangle ABC, D is the mid-point of side AC such that $BD = \frac{1}{2}AC$. Show that $\angle ABC$ is a right angle.

113. In the given figure, if $AB \parallel CD, EF \parallel BC, \angle BAC = 65^\circ$ and $\angle DHF = 35^\circ$, find $\angle AGH$.

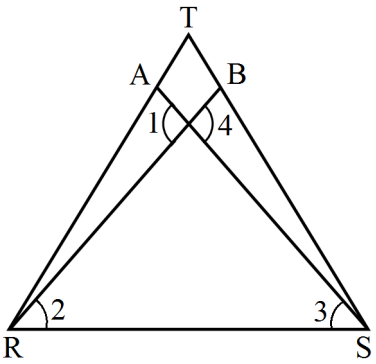


114. If the angles A, B and C of $\triangle ABC$ satisfy the relation B − A = C − B, then find the measure of $\angle B$.

115. In the given figure, if $AB \parallel DE$ and $BD \parallel FG$ such that $\angle FGH = 125^\circ$ and $\angle B = 55^\circ$, find x and y.

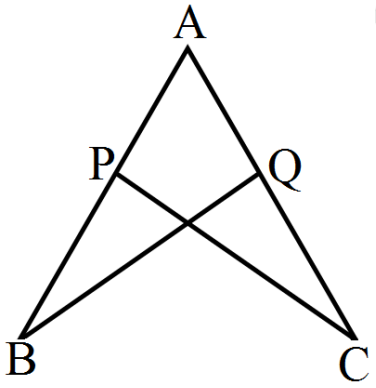


116. In Fig. it is given that $RT = TS, \angle 1 = 2\angle 2$ and $\angle 4 = 2\angle 3$. prove that $\triangle RBT \cong \triangle SAT$.



117. In $\triangle ABC$, side AB is produced to D so that $BD = BC$. if $\angle B = 60^\circ$ and $\angle A = 70^\circ$. Prove that: (i) AD > CD (ii) AD > AC

118. In the given figure, if $AB = AC$ and $\angle B = \angle C$. Prove that $PQ = CP$.

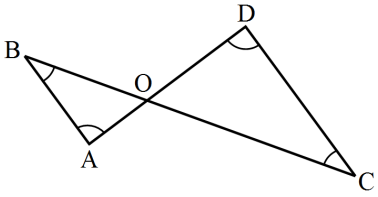


119. In $\triangle ABC, \angle B = 35^\circ, \angle C = 65^\circ$ and the bisector of $\angle BAC$ meets BC in P. Arrange AP, BP and CP in descending order.

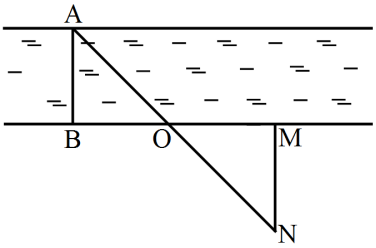
120. In an isosceles triangle, if the vertex angle is twice the sum of the base angles, calculate the angles of the triangle.

121. In a $\triangle ABC$, D is the midpoint of side AC such that $BD = \frac{1}{2}AC$. Show that $\angle ABC$ is a right angle.

122. In the given figure, $\angle B < \angle A$ and $\angle C < \angle D$. Show that $AD < BC$.

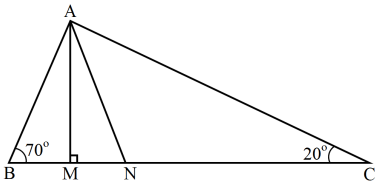


123. In the adjoining figure, explain how one can find the breadth of the river without crossing it.



124. The bisectors of $\angle B$ and $\angle C$ of an isosceles $\triangle ABC$ with AB = AC intersect each other at a point O.Show that the exterior angle adjacent to $\angle ABC$ is equal to $\angle BOC$.

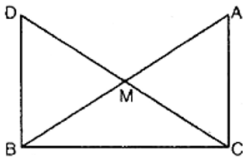
125. In the given figure, $AM \perp BC$ and AN is the bisector of $\angle A$. If $\angle ABC = 70^\circ$ and $\angle ACB = 20^\circ$, find $\angle MAN$.



126. In $\triangle PQR$, if $\angle P - \angle Q = 42^\circ$ and $\angle Q + \angle R = 21^\circ$, find $\angle P, \angle Q$ and $\angle R$.

*** Answer the following questions. [5 Marks Each] [60]**

127. In right triangle ABC, right angled at C, M is the mid-point of hypotenuse AB. C is joined to M and produced to a point D such that DM = CM. Point D is joined to point B. (See figure)



Show that:

i. $\triangle AMC \cong \triangle BMD$
ii. $\angle DBC$ is a right angle.
iii. $\triangle DBC \cong \triangle ACB$
iv. CM = $\frac{1}{2}$ AB

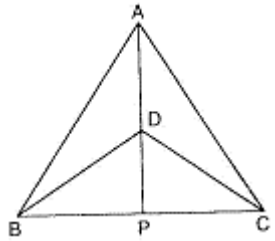
128. $\triangle ABC$ and $\triangle DBC$ are two isosceles triangles on the same base BC and vertices A and D are on the same side of BC. If AD is extended to intersect BC at P, show that :

i. $\triangle ABD \cong \triangle ACD$

ii. $\triangle ABP \cong \triangle ACP$

iii. AP bisects $\angle A$ as well as $\angle D$

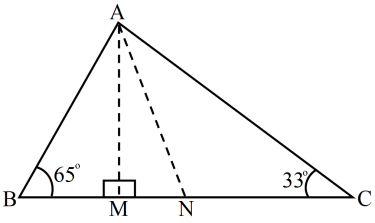
iv. AP is the perpendicular bisector of BC.



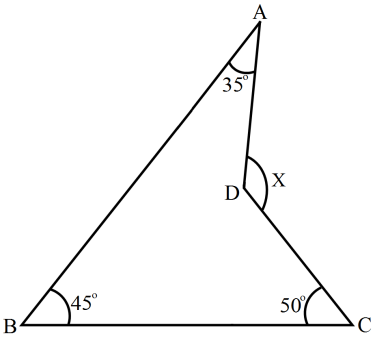
129. Bisectors of the angles B and C of an isosceles $\triangle ABC$ with AB = AC intersect each other at O. Show that external angle adjacent to $\angle ABC$ is equal to $\angle BOC$.

130. M is a point on side BC of a triangle ABC such that AM is the bisector of $\angle BCA$. Is it true to say that perimeter of the triangle is greater than 2AM? Give reason for your answer?

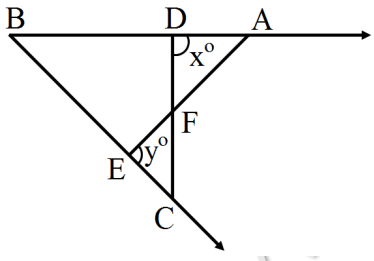
131. In Fig. $AM \perp BC$ and AN is the bisector of $\angle A$. If $\angle B = 65^\circ$ and $\angle C = 33^\circ$, find $\angle MAN$.



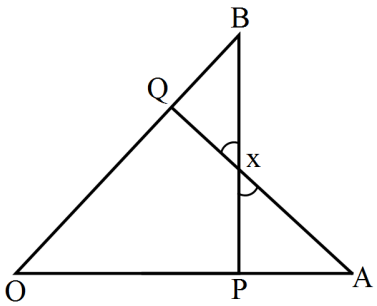
132. In the given figure, compute the value of x.



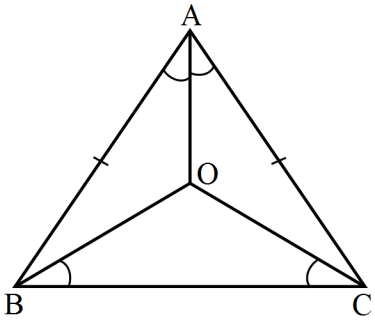
133. In the given figure, if x = y and AB = CB then prove that AE = CD.



134. In the given figure, OA = OB and OP = OQ. Prove that (i) PX = QX, (ii) AX = BX.



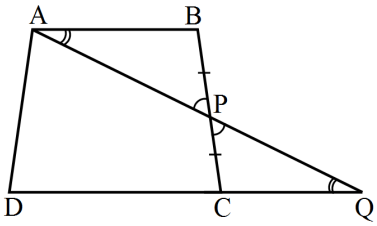
135. In $\triangle ABC$, AB = AC and the bisectors of $\angle B$ and $\angle C$ meet at a point O. Prove that BO = CO and the ray AO is the bisector of $\angle A$.



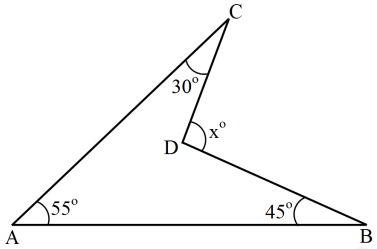
136. In the given figure, ABCD is a quadrilateal in which AB || DC and P is the midpoint of BC. On producing, AP and DC meet at Q. Prove that

i. AB = CQ,

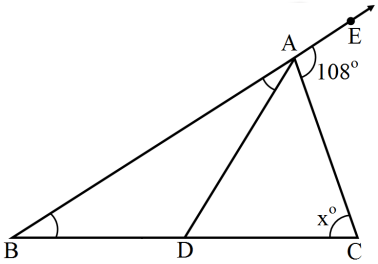
ii. DQ = DC + AB.



137. Calculate the value of x in the given figure.



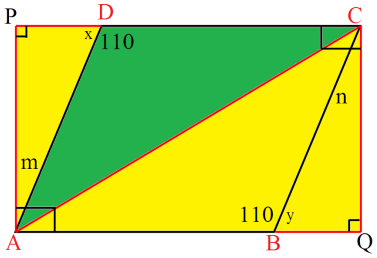
138. In the given figure, AD divides $\angle BAC$ in the ratio 1 : 3 and AB = DB. Determine the value of x.



*** Case study based questions.** **[12]**

139. Read the Source/ Text given below and answer these questions:

In the middle of the city, there was a park ABCD in the form of a parallelogram form so that AB = CD, AB || CD and AD = BC, AD || BC Municipality converted this park into a rectangular form by adding land in the form of $\triangle APD$ and $\triangle BCQ$. Both the triangular shape of land were covered by planting flower plants.



Answer the following questions:

i. What is the value of $\angle x$?
   a. 110°
   b. 70°
   c. 90°
   d. 100°

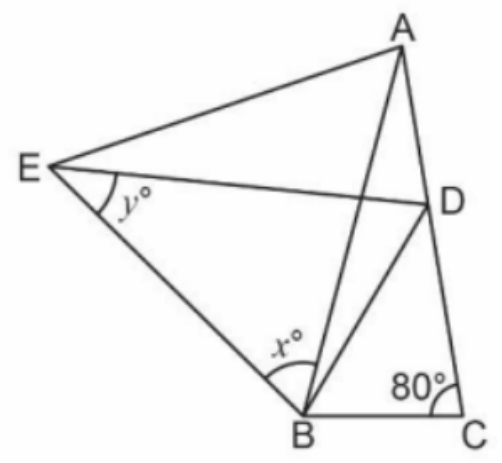
ii. $\triangle APD$ and $\triangle BCQ$ are congruent by which criteria?
   a. SSS
   b. SAS
   c. ASA
   d. RHS

iii. PD is equal to which side?
   a. DC
   b. AB
   c. BC
   d. BQ

iv. $\triangle ABC$ and $\triangle ACD$ are congruent by which criteria?
   a. SSS
   b. SAS
   c. ASA
   d. RHS

v. What is the value of $\angle m$?
   a. 110°
   b. 70°
   c. 90°
   d. 20°

140. In the given figure, the isosceles triangle ABC ≅ EAD. The point E is equidistant from both A and B.



4. What is the value of x?
   A. 40°
   B. 60°
   C. 70°
   D. 80°
5. What is the value of y?
6. What is the value of ∠BDC?
   A. 30°
   B. 40°
   C. 50°
   D. 70°

141. The picture below shows a staircase outside a house. Each step of the staircase is congruent and there are 25 steps in the staircase from the loor to the platform and 25 steps from the platform to the roof.

7. What is the length of the staircase railing?