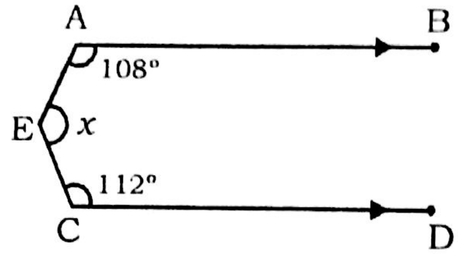
126. In figure AB||CD. Find the value of x.



(A) 72° (B) 140°
(C) 108° (D) 112°

127. The in-radius of an equilateral triangle is of length 3 cm. Then the length of each of its medians is:

(A) 12 cm (B) $\frac{9}{2}$ cm
(C) 4 cm (D) 9 cm

128. A right angled triangle with sides of 6 cm, 8 cm and 10 cm. Find the in-radius and circum radius respectively -

(A) 1 cm, 2 cm (B) 2 cm, 5 cm
(C) 5cm, 2 cm (D) 4cm. 5 cm

129. If G is the centroid and AD be a median with length of 12 cm of ΔABC, then the value of AG is ;

(A) 4 cm (B) 6 cm
(C) 8 cm (D) 10 cm

130. In a ΔABC, right angle at B. If the circum radius is 13, cm, then find the distance between orthocentre and circumcentre.

(A) 13 cm (B) 6.5 cm
(C) 8 cm (D) 12.5 cm

131. In a right angled ΔABC, $BD \perp AC$ and $AB = a$, $BC = b$, $AC = c$ and $BD = p$.

(A) $\frac{1}{a^2}+\frac{1}{c^2}=\frac{1}{p^2}$ (B) $\frac{1}{a^2}+\frac{1}{b^2}=\frac{1}{p^2}$

(C) $\frac{1}{b^2}+\frac{1}{c^2}=\frac{1}{p^2}$ (D) None of these

132. In a right angled ΔABC, $\angle B$ is right angle and $AC = 2\sqrt{5}$ cm. If $AB - BC = 2$ cm, then the value of $(\cos^2 A - \cos^2 C)$ is ;

(A) $\frac{3}{5}$ (B) $\frac{6}{5}$
(C) $\frac{3}{10}$ (D) $\frac{2}{5}$

133. ABC is a right-angled triangle. AD is perpendicular to the hypotenuse BC. If AC = 2AB. then the value of BD is :

(A) $\frac{BC}{4}$ (B) $\frac{BC}{5}$
(C) $\frac{BC}{2}$ (D) $\frac{BC}{3}$

134. In a right angled triangle ABC, $\angle B$ is right angle. BC is produce to any point D in such way that BC = 2DC. (BD > BC), then which one of following is correct.

(A) $AC^2 = AD^2 - 3CD^2$
(B) $AC^2 = AD^2 - 2CD^2$
(C) $AC^2 = AD^2 - 4CD^2$
(D) $AC^2 = AD^2 - 5CD^2$

135. In a right angled triangle, the medians also formed a right angled triangle then the ratio of sides of triangle is:

(A) $1:\sqrt{2}:\sqrt{3}$ (B) $2:\sqrt{6}:\sqrt{7}$
(C) $\sqrt{3}:\sqrt{3}:\sqrt{5}$ (D) $1:1:\sqrt{3}$

136. If G is the centroid of ΔABC and AG = BC, then $\angle BGC$ is :

(A) 45° (B) 60°
(C) 90° (D) 120°

137. In a triangle, medians BE and CF are the intersects of right angle, then which of the following is correct :

(A) $AB^2 + AC^2 = 5\ BC^2$
(B) $AB^2 + AC^2 = 4\ BC^2$
(C) $AB^2 + AC^2 = 3\ BC^2$
(D) $AB^2 + AC^2 = 2\ BC^2$

138. In ΔABC, $\angle BAC = 90^0$ and $AB = \frac{1}{2}BC$, then the $\angle ACB$ is equal to :

(A) 30^0 (B) 45^0
(C) 60^0 (D) 90^0

139. Two angles of a triangle are $\frac{1}{2}$ radian and $\frac{1}{3}$ radian. The measure of the third angle in degree $\left(\pi = \frac{22}{7}\right)$.

(A) $132\frac{1}{11}°$ (B) $132\frac{2}{11}°$
(C) $132\frac{3}{11}°$ (D) $132°$

140. In triangle ABC, AB = 12 cm, $\angle B = 60^0$, the perpendicular from A to BC meets it at D. The bisector of $\angle ABC$ meets AD at E. Then E divides AD in the ratio :

(A) 1 : 1 (B) 2 : 1
(C) 3 : 1 (D) 6 : 1

141. Which of the following sides form a acute angled triangle.

(A) 6, 9, 10
(B) 7, 8, 11
(C) 5, 12, 13
(D) both (A) and (B)

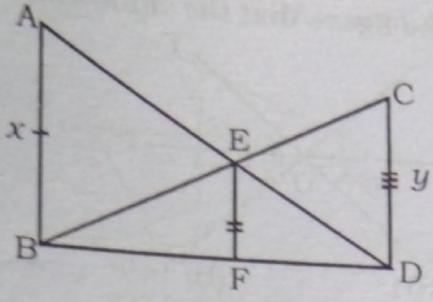
142. If the ratio of areas of two similar triangles is 9 : 16, then the ratio of their corresponding sides is :

(A) 3 : 5 (B) 3 : 4
(C) 4 : 5 (D) 4 : 3

143. If the sides of a triangle are in the ratio 3 : 4 : 5, then R : r is equal to:

(A) 5 : 2 (B) 2 : 5
(C) 3 : 7 (D) 7 : 3

144. In the figure $\angle ABD = \angle EFD = \angle CDB = \frac{\pi}{2}$. If AB = x, CD = y and EF = z then which of following is correct.

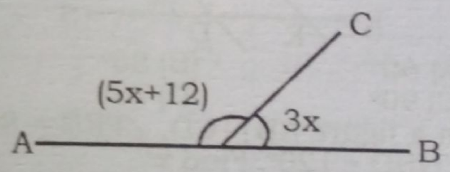


(A) $\frac{1}{x}+\frac{1}{y}=\frac{1}{z}$ (B) $\frac{1}{x}+\frac{1}{z}=\frac{1}{y}$
(C) $\frac{1}{z}+\frac{1}{y}=\frac{1}{x}$ (D) $\frac{1}{x}+\frac{1}{y}=\frac{1}{z}$

145. The sum of three altitudes of a triangle is

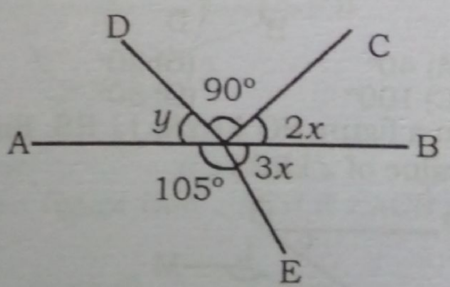
(A) Equal to the sum of the three sides
(B) Less than the sum of sides
(C) Greater than the sum of sides
(D) Twice the sum of sides

146. What is the value of x in figure ?



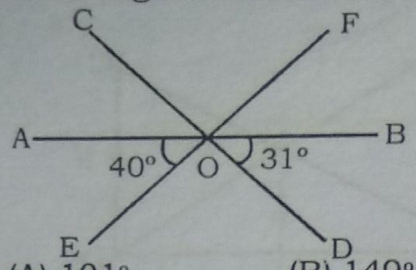
(A) 18° (B) 20°
(C) 21° (D) 24°

147. In figure AB is a straight line. Find $(x+y)$:



(A) 55° (B) 65°
(C) 75° (D)80°

148. In the figure find the value of $\angle BOC$:



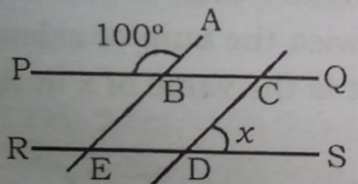
(A) 101° (B) 149°
(C) 71° (D) 140°

149. If $(2x+17)°$, $(x+4)°$ are complementary, find x :
(A) 63° (B) 53°
(C) 35° (D) 23°

150. If $(5y+62)°$, $(22+y)$ are supplementary find y:
(A) 16° (B) 32°
(C) 8° (D) 21°

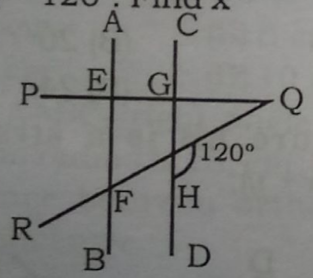
151. If two supplementary angles are in the ratio 13 : 5 find the greater angle:
(A) 130° (B) 65°
(C) 230° (D) 50°

152. In a figure AE || CD and BC|| ED, then find x:



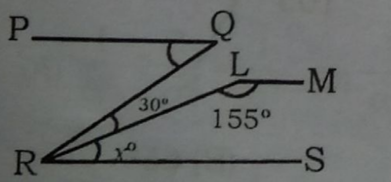
(A) 60° (B) 80°
(C) 90° (D) 75°

153. In a figure AB||CD, $\angle PEB = 80°$ and $\angle DHQ = 120°$. Find x°



(A) 40° (B) 20°
(C) 100° (D) 30°

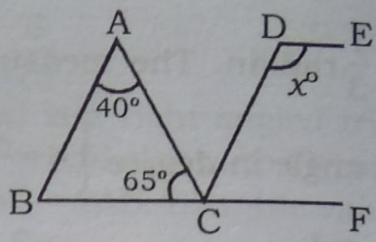
154. In a figure PQ || LM || RS. Find the value of $\angle LRS$:



(A) 25° (B) 55°
(C) 65° (D) 75°

155. How many degrees are there in an angle which equals one-fifth of its supplement ?
(A) 15° (B) 30°
(C) 75° (D) 150°

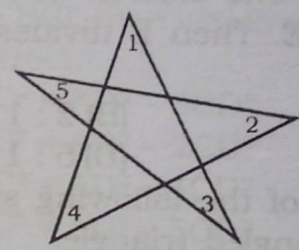
156. In a figure AB||CD, and DE||BF. Find the value of $x°$:



(A) 140° (B) 155°
(C) 105° (D) 115°

157. Find the measure of an angle which is complement of itself.
(A) 30 (B) 45
(C) 60 (D) 90

158. In figure find $\angle 1 + \angle 2 + \angle 3 + \angle 4 + \angle 5$?

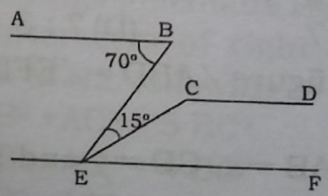


(A) 180° (B) 270°
(C) 360° (D) 540°

159. Two supplementary angles are in the ratio 2 : 3. Find the smaller angles.
(A) 72° (B) 40°
(C) 60° (D) 55°

160. ABE is an equilateral triangle formed on the side of the square ABCD. Find $\angle ADE$
(A) 30° (B) 15°
(C) 90° (D) 50°

161. Find angle ECD in the figure given below

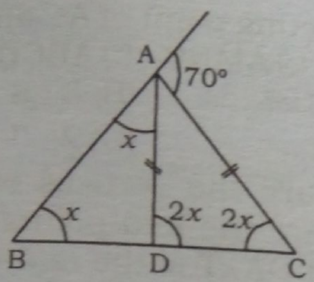


(A) 75° (B) 85°
(C) 90° (D) 125°

162. Δ ABC and Δ PQR are similar and the perimeter are 24cm and 60cm. If one side of Δ ABC is 10cm, then calculate the corresponding side.

(A) 20 cm (B) 35 cm
(C) 25 cm (D) 100 cm

163. In the figure given below . Find $\angle ACD$ when AD = BD = AC



(A) $\frac{140}{3}$ (B) $\frac{70}{3}$
(C) 70 (D) 140

164. AB is the chord of a circle with centre O and DOC is a line segment originating from a point D on the circle and intersecting AB produced at C such that BC = OD. Find$\angle AOD$ if $\angle BCD = 20°$

(A) 80° (B) 30°
(C) 60° (D) 50°

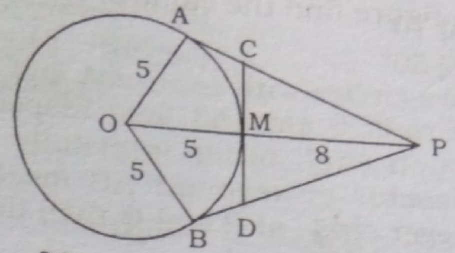
165. In ΔABC a line DE in drawn parallel to BC such that it divides the triangle in two equal part. Then Find AD : DB.

(A) $1 : \sqrt{2}$ (B) $\sqrt{2}-1 : 1$
(C) $1 : \sqrt{2}-1$ (D) $\sqrt{2} : 1$

166. AB and CD are the two chords of a circle on opposite sides of the centre. If the length of both are 6cm and 8cm respectively and the radius of circle is 5cm, find the distance between the two chords.

(A) 6 cm (B) 7 cm
(C) 8 cm (D) 9 cm

167. In the given figure, radius of the circle is 5cm, length of OP is 13 cms. and length of the tangent AP is 12cms. Find the length of CD.



(A) $\frac{20}{3}$ (B) 10
(C) $\frac{10}{3}$ (D) $\frac{40}{3}$

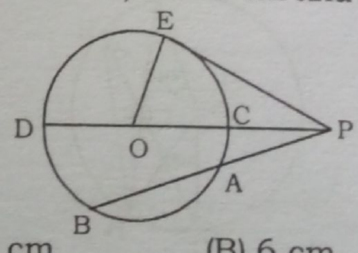
168. In a right angle triangle ABC, $\angle B = 90°$. The external bisector of $\angle A$ meets the extended part of CB at D. if side AB is 7cm , and AC = 25 cm, find DB.

(A) $\frac{40}{3}$ cm (B) $\frac{28}{3}$ cm
(C) 28 cm (D) 14 cm

169. $2a$ and $2b$ are two chords of a circle which intersect each other at right angle. If the distance from its intersecting point to the centre of the circle is c and c is less than radius then. Find the radius of the circle.

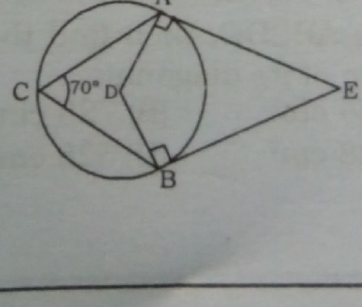
(A) $\sqrt{\frac{a^2+b^2+c^2}{2}}$ (B) $\frac{1}{2}\sqrt{a^2+b^2+c^2}$
(C) $\sqrt{a^2+b^2+c^2}$ (D) $\sqrt{\frac{a^2+b^2+c^2}{3}}$

170. Find the length of OE in the given figure if OP = 13cm , PA = 9 cm and AB = 7cm.



(A) 5 cm (B) 6 cm
(C) 7 cm (D) 9 cm

171. In given figure find $\angle AEB$ if $\angle ACB$ in of 70°.

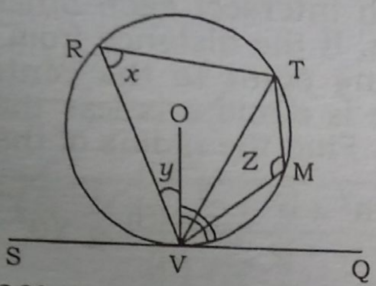


(A) 70° (B) 40°
(C) 50° (D) 140°

172. Two circles with centres A and B and of radii 5 cm and 3cm respectively touch each other internally. If ⊥ bisector of segment AB meets the bigger circle at P and Q then find the length of PQ.
(A) $4\sqrt{6}$ (B) $2\sqrt{6}$
(C) $3\sqrt{6}$ (D) $\sqrt{6}$

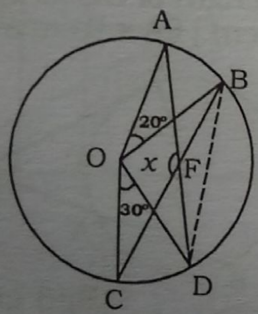
173. A, B and C are three vertex on a circle such that a tangent touches the circle at A and meets the extended part of BC at T. Find $\angle BAC$ if $\angle CAT = 44°$ and $\angle CTA = 40°$
(A) 52° (B) 68°
(C) 128° (D) 118°

174. In the given figure $\angle RTV = 50°$ and $\angle TVQ = 50°$. Find the sum of the angle x, y and z.



(A) 220° (B) 120°
(C) 140° (D) 240°

175. Find $\angle x$ in the given figure.



(A) 125° (B) 135°
(C) 155° (D) 165°

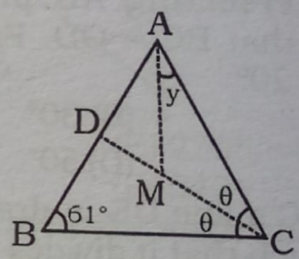
176. ABCD is a trapezium in which BC is 8, CD is 10, AD is 12 and AB is 16cm. If side AB□DC, then find the sum of square of its diagonals.
(A) 884 cm² (B) 728 cm²
(C) 628 cm² (D) 528 cm²

177. ABCD are the vertex of the square. T and U are the mid-points of AB and BC and V is a point inside the square such that VT = VU and BV = 2DV. The find ratio of area of $\Delta VTU : \Delta BTU$.
(A) 5 : 3 (B) 3 : 5
(C) 1 : 2 (D) 4 : 4

178. ABCD are the vertices of a square and M is the Mid-point of AD. N is the intersecting point of AC and BD. Find ratio of □ AMNB : □ ABCD.
(A) 8 : 3 (B) 3 : 8
(C) 4 : 1 (D) 2 : 3

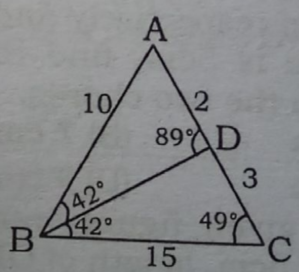
179. ABCD are the vertices of a square. PQRS are the mid-points of AB, BC, CD and DA. T is the mid-point of SP. Find the ratio of the area of Δ ATS to the area of Δ PQT.
(A) 2 : 1 (B) 2 : 3
(C) 4 : 3 (D) 1 : 2

180. In given figure, if CD is the angle bisector of $\angle C$ and AD = AM, then find the value of y.



(A) 61° (B) 61 + 0°
(C) $\frac{61°}{2}$ (D) 90°

181. In given figure, AB = 10 cm, BC = 15 cm and ratio of sides of AD to CD is 2 : 3. Then find the value of $\angle DBA$?

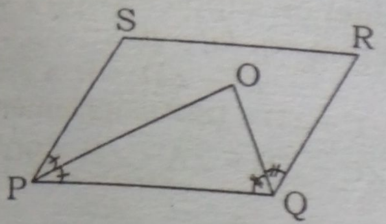


(A) 42° (B) 47°
(C) 89° (D) 80°

Solution

1. (B) 2. (D) 3. (A) 4. (C)
5. (C) 6. (D) 7. (D)

8. (A)



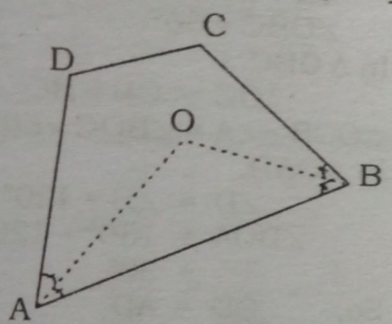
Let $\angle P = 2x$ and $\angle Q = 2y$
So,

$$2x + 2y = 180^\circ$$
$$x + y = 90^\circ$$

In Δ OPQ

$$\angle POQ = 180^\circ - \angle POQ - \angle PQO$$
$$= 180^\circ - (x + y)$$
$$= 180^\circ - 90^\circ = 90^\circ$$

9. (B)

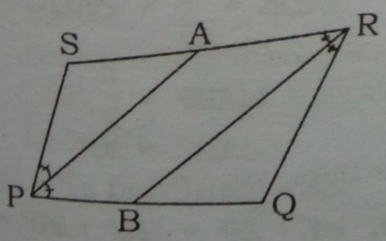


$$\angle A + \angle B + \angle C + \angle D = 360^\circ$$
$$\frac{1}{2}\angle A + \frac{1}{2}\angle B = \frac{1}{2}[360^\circ - \angle C - \angle D$$

In Δ OAB

$$\Delta OBA + \Delta AOB = 180^\circ$$
$$\angle AOB = 180^\circ - \left[180^\circ - \frac{1}{2}(\angle C + \angle D)\right]$$
$$= \frac{1}{2}(\angle C + \angle D)$$

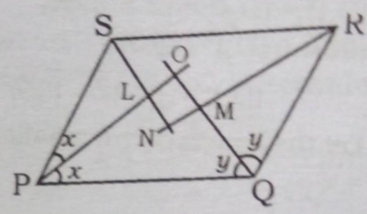
10. (B)



As shown in the figure

$$\angle APB = \frac{1}{2}\angle A = 30^\circ$$
$$\angle BRA = \frac{1}{2}\angle R = 50^\circ$$
$$\angle PAR + \angle PBR = 360^\circ - 30^\circ - 50^\circ$$
$$= 280^\circ$$
$$\angle PAS + \angle RBQ = 180^\circ + 180^\circ - 280^\circ$$
$$= 80^\circ$$

11. (C)



In a parallelogram

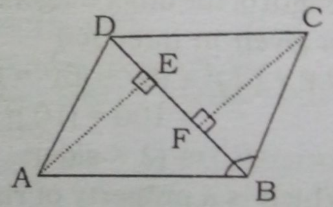
$$2x + 2y = 180^\circ$$
$$x + y = 90^\circ$$

In Δ OPQ

$$\angle O = 180^\circ - (x + y)$$
$$= 90^\circ$$

Similarly $\angle L = \angle M = \angle N = 90^\circ$

12. (A)



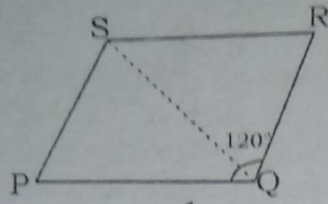
Since BD is a diagonal of llgm ABCD.

$\therefore$ area of ΔABD = ar of ΔBDC

$$\frac{1}{2} BD \times AE = \frac{1}{2} \times BD \times CF$$
$$AE = CF$$

13. (A)

14. (D)



$\angle PQS = \frac{1}{2}\angle Q = 60°$

$\angle P = 180° - \angle Q = 60°$

$\angle S = 60°$

So, Δ PQS is equilateral triangle

$QS = PQ = 6$ cm.

15. (B) Perimeter of rhombus = 146 cm

So, the side of rhombus $= \frac{146}{4} = 36.5$ cm

One of its diagonal = 55 cm

ATQ,

$(D_1)^2 + (D_2)^2 = (2 \times \text{side})^2$

$(55)^2 + (D_2)^2 = (73)^2$

$(D_2) = \sqrt{(73)^2 - (55)^2} = 48$ cm

16. (C) Let the length of the smaller diagonal $= x$

ATQ, $\frac{1}{2} \times x \times 2x = 25$

$x = 5$ cm

Sum of the diagonals $= x + 2x = 3x$

$= 15$ cm

17. (B) ATQ,

$(D)^2 + (12)^2 = (2 \times 10)^2$

$D = \sqrt{(20)^2 - (12)^2} = 16$ cm

Length of the other diagonal = 16 cm

18. (A) As given in question

$(d_1)^2 + (d_2)^2 = (8)^2 + (6)^2 = 64 + 36$

$= 100 = (10)^2 = (2 \times 5)^2$

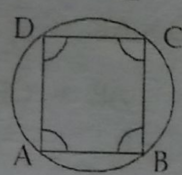
$= (2 \times \text{side})^2$

Which is a property of rhombus,

So, Area $= \frac{1}{2} d_1 d_2$

$= \frac{1}{2} \times 8 \times 6 = 24 \text{ cm}^2$

19. (D)



ABCD is a cycle Rombus

$\angle A + \angle C = 180°$ ...(i)

(opposite angle of cycle quadrilateral)

$\angle A + \angle D = 180°$ ...(ii)

(sum of interior angles of two parallel lines with transversal line) or supplementary angle

From eq. (ii) – (i)

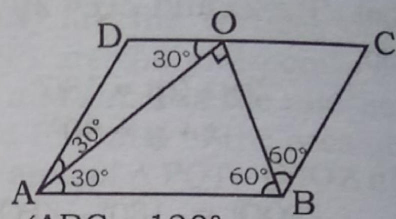
$\angle C - \angle D = 0 \cong \angle C = \angle D$

$\because \angle C + \angle D = 180°$ (supplementry angles)

$\therefore \angle C = \angle D = \angle A = \angle B = 90°$

20. (C)

21. (C)



$\angle ABC = 120°$

Then,

$\angle A = 60°$, $\angle AOB = 90°$ and $\angle OBC = 60°$

In Δ OBC

$OC = OB = BC$ ...(i)

$\{\because \angle OCB = \angle A = \angle BOC = 60° = \angle BOC\}$

In Δ OAD,

$\angle D = \angle B = 120°$

$\angle DOA = 180° - 120° - 30°$

$= 30°$

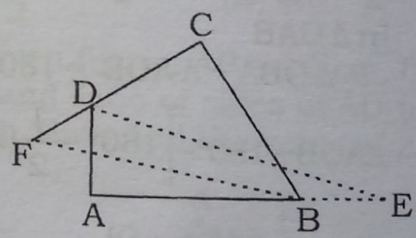
So, $OD = AD$ ...(ii)

From equation (i) and (ii)

$OD = AD = OC = BC$ $(AD = BC)$

So, $CO : DO = 1 : 1$

22. (A)



$\angle ADE = \frac{1}{2} \times \angle ADC = 25°$

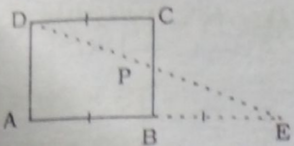
$\angle ABF = \frac{1}{2} \times$

$\angle ABC = 20°$

$\angle E = \angle ABF$ and $\angle F = \angle ADE$

So, $\angle E + \angle F = 25° + 20° = 45°$

23. (C)



AB = BE (given)

In Δ PCD and Δ BPE

BE = CD [$\because$ AB = CD opposite side of llgm and AB = BE (given)]

$\angle CPO = \angle BPE$

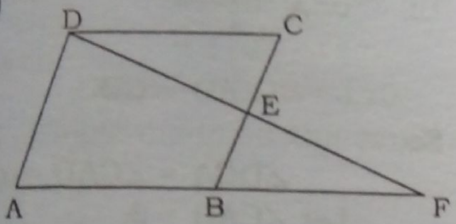
(vertically opposite angle)

$\angle PCD = \angle PBE$, $\angle PDC = \angle PEB$

$\therefore$ PCD $\cong$ PBE (by ASA condition)

$\therefore$ PC = PB $\therefore$ PC : PB = 1:1

24.(B)



BE is mid point of BC

So, AD = BC = 2 × BE

In Δ BEF and Δ ADF

$\angle DAF = \angle EBF$, $\angle ADF = \angle BEF$

$\angle F = \angle F$ (common)

ΔBEF ⊔ ΔADF

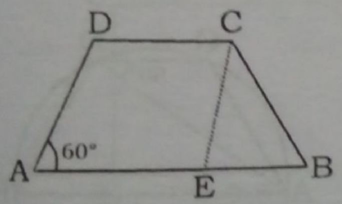
$$\frac{AF}{BF} = \frac{AD}{BE} = \frac{2}{1}$$

$AB + BF = 2 \times BF$

$AB = BF$

So, AF : AB = 2 : 1

25. (A)



Let us draw a line parallel to AB i.e. CE.

So, AECD is parallelogram, i.e. AD = CE

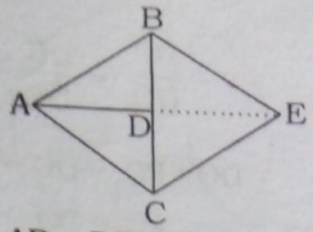
Also, $\angle A = \angle CEB = 60°$

In ΔBCE,

AD = CE = BC

So, $\angle B = \angle CEB = 60°$

26. (C)

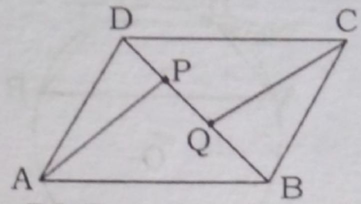


AD = DE (Given)

BD = CD (Property of median)

If diagonal of any quadrilateral bisects each other then it is a parallelogram.

27. (A)



AD =BC (Property of parallelogram)

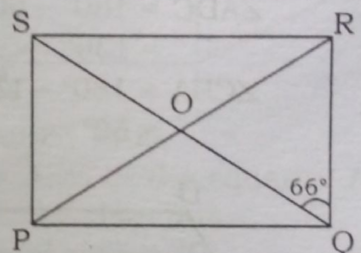
$\angle ADP = \angle QBC$ (Alternate angle)

DP = BQ (given)

Δ ADP $\cong \Delta$ CBQ [S-A-S property]

AP = CQ $\cong$ AP : CQ = 1 : 1

28. (A)



PR = QS (diagonal of rectangle)

OR = OP = OQ = OS (property of rectangle)

In Δ ORQ, OR = OQ

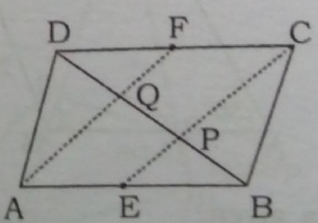
So, $\angle ORQ = \angle OQR = 66°$

Also,

$\angle OPS = \angle OPQ$ (Alternate angle)

$= 66°$

29. (A)



In Δ DFQ and Δ DCP

Δ DFQ ⊔ Δ DCP

So,

$$\frac{DP}{DQ} = \frac{DC}{DF}$$

$$DQ + PQ = DQ \times \left(\frac{2}{1}\right)$$

$$PQ = DQ$$

Similarly,

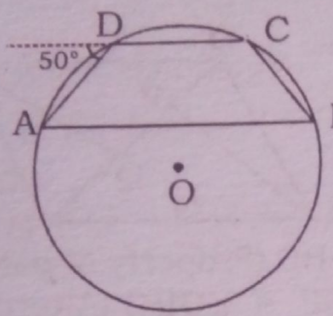
$$BP = PQ$$

So,

$$BP : PQ : DQ = 1 : 1 : 1$$

30. (B)

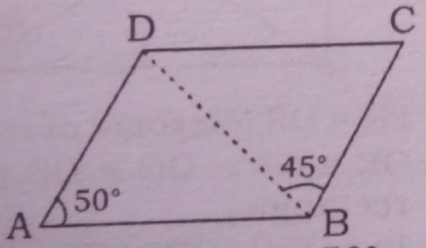
31. (A)



So, as given

$$\angle PDA = 50^\circ$$
$$\angle ADC = 180^\circ - 50^\circ$$
$$= 130^\circ$$
$$\angle CBA = 180^\circ - 130^\circ$$
$$= 50^\circ$$

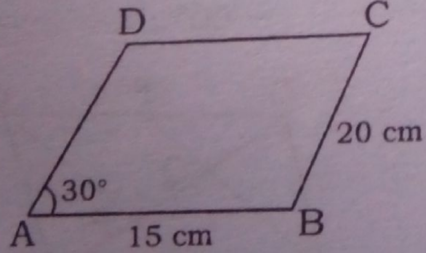
32. (D)



So,

$$\angle C = \angle A = 50^\circ$$
$$\angle BDC = 180^\circ - 50^\circ - 45^\circ$$
$$= 85^\circ$$

33. (A)



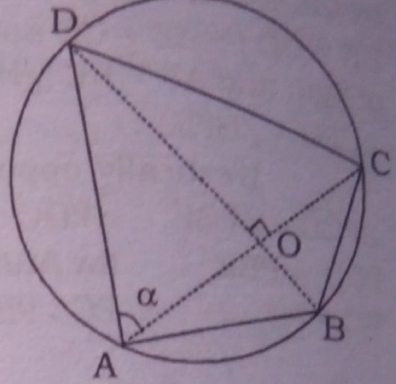
As given,

$$AD = BC = 20 \text{ cm}$$

So,

$$\text{Area of } ABCD = 15 \times 20 \times \sin 30^\circ$$
$$= 15 \times 20 \times \frac{1}{2}$$
$$= 150 \text{ cm}^2$$

34. (C)



$$AD = CD$$

So,

$$\angle DCA = \angle CAD = \alpha$$

Let $\angle CAB = \beta$

$$AB = BC$$

So,

$$\angle CAB = \angle BCA = \beta$$

ABCD is a cyclic quadrilateral

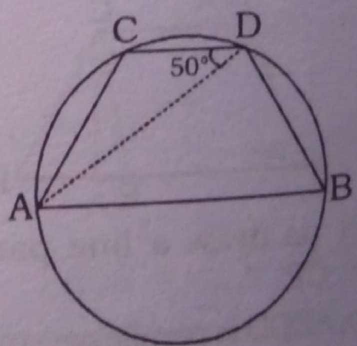
So,

$$\angle A + \angle C = 180^\circ$$
$$(\alpha + \beta) + (\alpha + \beta) = 180^\circ$$
$$\beta = 90^\circ - \alpha$$

In ΔABO

$$\angle CAB + \angle ABC + \angle BCA = 180^\circ$$
$$\angle ABC = 180^\circ - (90^\circ - \alpha) - (90^\circ - \alpha)$$
$$= 2\alpha$$

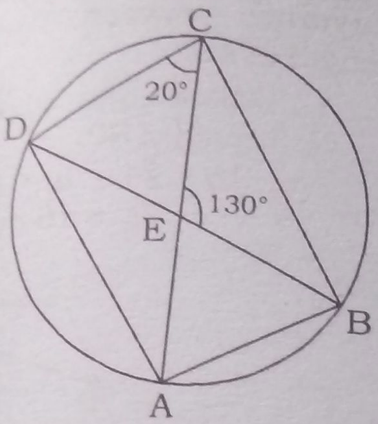
35. (C)



$\angle BCA = 90^\circ$ (Property of triangle)

$$\angle BAD = 180^\circ - \angle BCD$$
$$= 180^\circ - (90^\circ + 50^\circ)$$
$$= 40^\circ$$

36. (D)
37. (B)



$\angle DEC = 180° - 130° = 50°$

$\angle CDE = 180° - \angle DEC - \angle ECD$

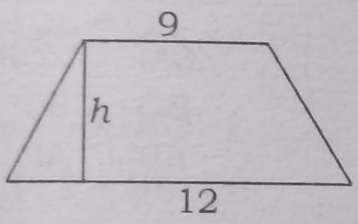
$= 180° - 50° - 20°$

$= 110°$

$\angle BAC = \angle CDB = 110°$

[Angle made on the same chord]

38. (B)



Area of trapezium

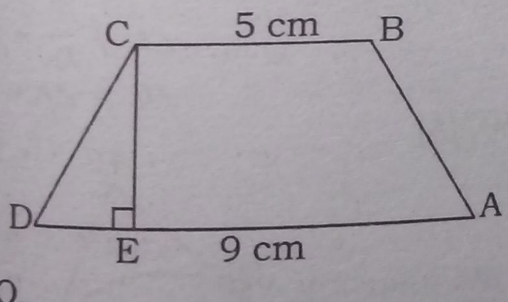
$= \frac{1}{2} \times \text{height} \times (\text{sum of parallel sides})$

ATQ,

$105 = \frac{1}{2} \times \text{height} \times (9 + 12)$

height = 10 cm

39. (A)



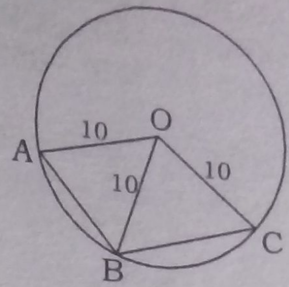
ATQ,

$\text{height} = \frac{35 \times 2}{5+9} = \frac{70}{14} = 5 \text{ cm}$

$DE = \frac{1}{2}(AD - BC) = 2 \text{ cm}$

$CD = \sqrt{(5)^2 + (2)^2} = \sqrt{29} \text{ cm}$

40. (B)



OA = OC = AB = BC = side of the rhombus

OA = OB = OC = Radius of the circle

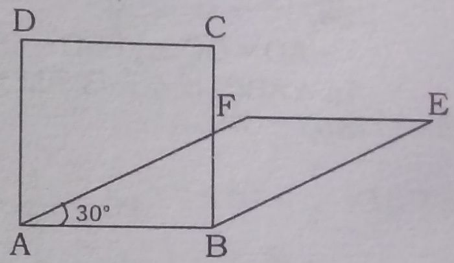
Area of the rhombus

$= 2 \times \frac{\sqrt{3}}{4} \times 10 \times 10$

$= 50\sqrt{3} \text{ cm}^2$

41. (A)

42. (D)



Required ratio

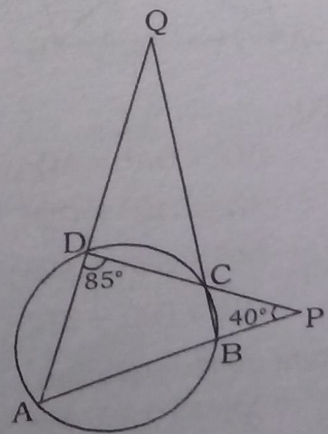
= Area of the square : Area of the rhombus

$= a^2 : a^2 \sin 30°$

$= a^2 : \frac{a^2}{2}$

= 2 : 1

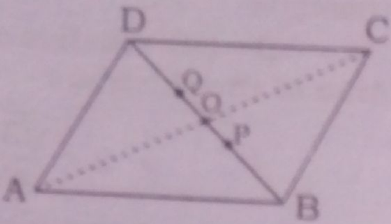
43. (C)



$\angle CBP = \angle ADC = 85°$
$\angle BCP = 180° - \angle CBP - \angle BPC$
$= 180° - 85° - 40°$
$= 55°$
$\angle QCD = \angle BCP = 55°$
$\angle CQD = 85° - \angle QCD$
$= 85° - 55°$
$= 30°$

44. (B)

45. (A)



As we know, diagonals of parallelogram bisects each other.
So,

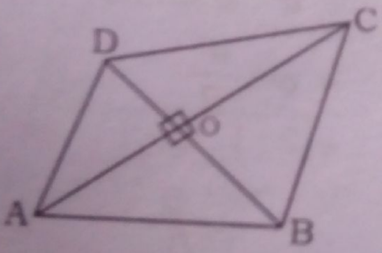
$AO = OC$ and $OD = OB = 6$ cm

In ΔABC, centroid will lie on OB
So,

$$PO = \frac{1}{3} \times 6 = 2 \text{ cm}$$

Similarly, $OQ = 2$ cm
$PQ = PO + OQ$
$= 4$ cm

46. (B)



ATQ

$OD^2 + OA^2 = AD^2$
$OD^2 + OC^2 = CD^2$
$OC^2 + OB^2 = BC^2$
$OB^2 + OA^2 = AB^2$

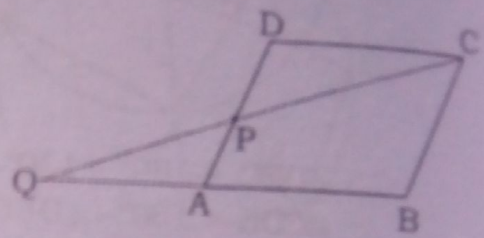
From above equation

$AB^2 + CD^2 = BC^2 + DA^2$

47. (C) ATQ,
Distance between AB and CD × length of AB
= Distance between AD and BC × Length of BC

$10 \times 24 = h_1 \times 16$
$h_1 = 15$ cm

48. (A)



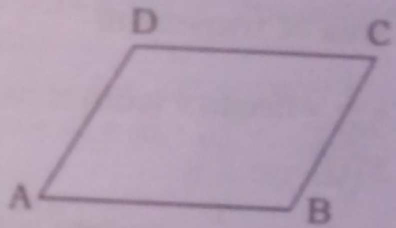
$$AP = \frac{1}{2} AD = \frac{1}{2} BC$$

In Δ QAP and Δ QBC
$\angle QAP = \angle QBC$
$\angle QPA = \angle QCB$
$\angle Q = \angle Q$ (common)
$\angle QAP \sim \angle QBC$

$$\frac{BQ}{AB} = \frac{BC}{AP} = \frac{2}{1}$$

$BQ : AB = 2 : 1$

49. (C)

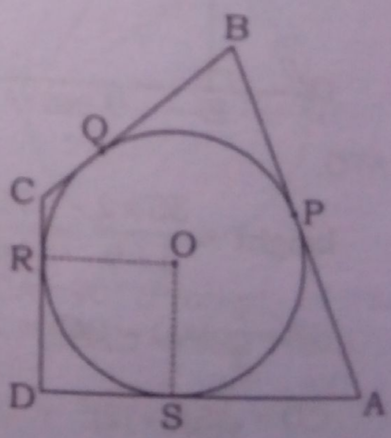


$\angle A : \angle B = 4 : 5$
$\angle A + \angle B = 180°$

$$\angle A = \frac{4}{9} \times 180° = 80°$$

$\angle C = \angle A = 80°$

50. (A)



$BQ = BP = 27$

$CQ = BC - BQ = 45 - 27$

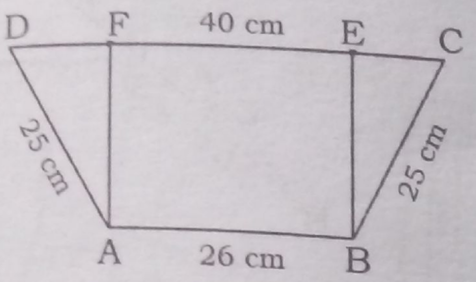
$= 18$ cm

$CR = CQ = 18$ cm

Radius (OS) $= RD = CD - CR$

$= 25 - 18 = 7$ cm

51. (B)



$DF = EC$

$DF = \frac{1}{2}(40 - 26) = 7$ cm

Height of trapezium

$= \sqrt{(25)^2 - (7)^2}$

$= 24$ cm

Area of trapezium

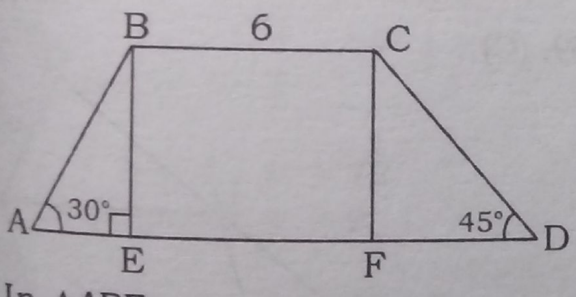
$= \frac{1}{2} \times$ height $\times$ sum of sides

$= \frac{1}{2} \times 24 \times (26 + 40)$

$= \frac{1}{2} \times 24 \times 66$

$= 792 \text{ cm}^2$

52. (A)



In ΔABE

$BE = AB \times \sin 30°$

$= 6$ cm

$AE = AB \times \cos 30°$

$= 6\sqrt{3}$ cm

$CF = BE = 6$ cm

$DF = CF \times \cot 45°$

$= 6$ cm

$AD = 6\sqrt{3} + 6 + 6$

$= \left(12 + 6\sqrt{3}\right)$ cm

$BC = 6$ cm

$BE = 6$ cm

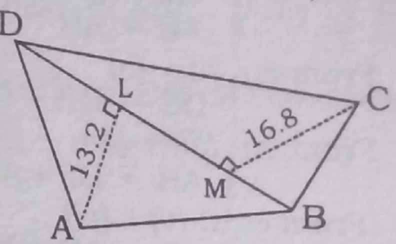
Area of trapezium

$= \frac{1}{2} \times BE \times (BC + AD)$

$= \frac{1}{2} \times 6 \times \left(12 + 6\sqrt{3} + 6\right)$

$= 18\left(3 + \sqrt{3}\right)$ cm

53. (B)



Area of ABCD

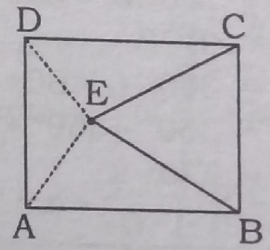
$=$ Area of ΔABD + Area of ΔBCD

$= \frac{1}{2} \times 13.2 \times 64 + \frac{1}{2} \times 16.8 \times 64$

$= 32\,(13.2 + 16.8)$

$= 960 \text{ cm}^2$

54. (D)



In ΔBCE

$\angle BCE = \angle CBE = \angle BEC = 60°$

So,

$\angle ABE = 90° - 60° = 30°$

As

$BC = BE$ and $BC = AB$

$\angle AEB = \frac{180° - 30°}{2} = 75°$

Similarly,

$\angle CED = 75°$

$\angle AED = 360° - (75° + 75° + 60°)$

$= 150°$