



MATHS

BOOKS - PEARSON IIT JEE FOUNDATION

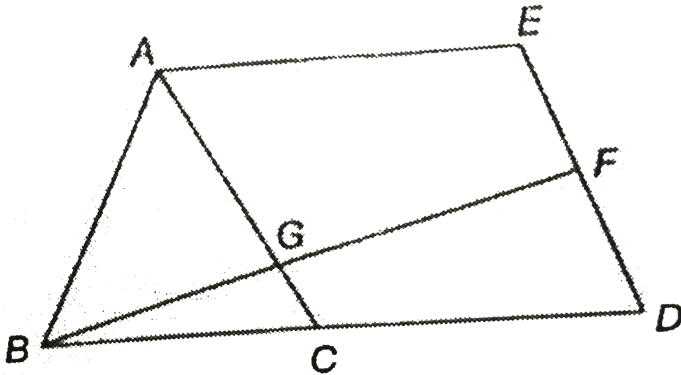
GEOMETRY

Example

1. Divide line segment $AB=10$ cm into six equal parts.

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2. In the given figure (not to scale), ABC is an isosceles triangle in which $AB=AC$. AEDC is a parallelogram. If $\angle CDF = 70^\circ$ and $\angle BFE = 180^\circ$, then find $\angle FBA$.



A. 30°

B. 40°

C. 50°

D. 80°

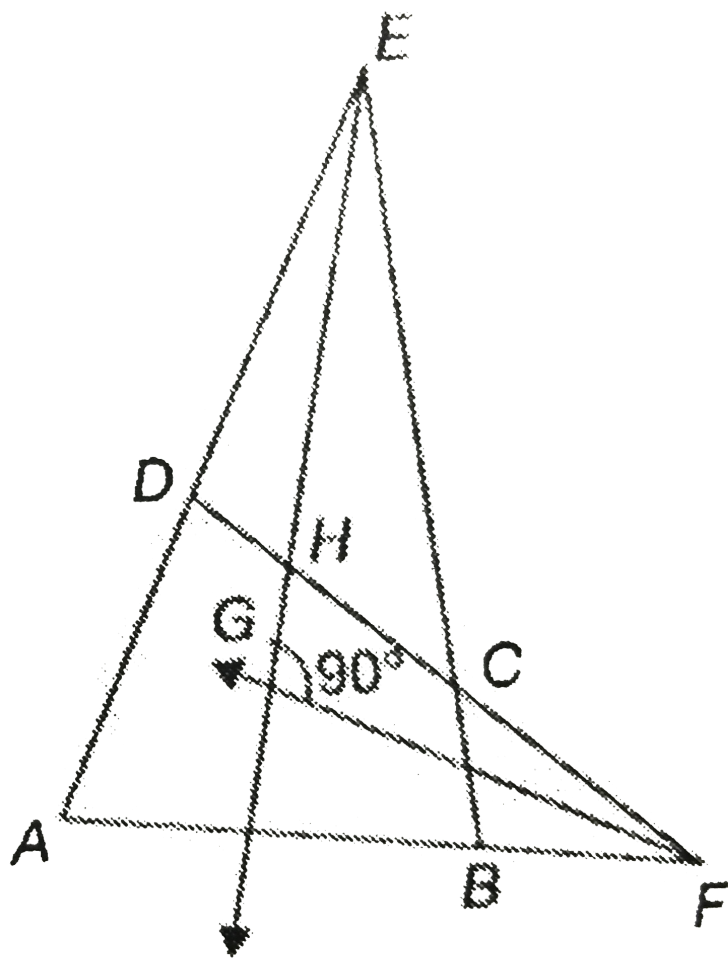
Answer:



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3. In the given figure, ABCD is a cyclic quadrilateral, $\angle DAB = 50^\circ$ and $\angle ABC = 80^\circ$. \overline{EC} and \overline{FG} are the angle bisectors of $\angle DEC$ and $\angle BFC$ Find

$\angle FHG$.



A. 80°

B. 90°

C. 75°

D. 105°

Answer:



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4. Find the number of diagonals of a 10-sided polygon.



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5. Find the sum of the interior angles of a polygon of 8 sides.



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6. Construct a triangle ABC , in which base $BC = 6cm$, $AB + AC = 9cm$ and $\angle ABC = 45^\circ$



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7. Construct $\triangle ABC$, whose perimeter is $10cm$ and base angles are 60° and 44° .



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8. Construct a triangle PQR , in which $QR = 4.5\text{cm}$, $\angle Q = 44^\circ$ and $PQ - PR = 2\text{cm}$.



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9. Construct $\triangle PQR$ in which $QR = 2.1\text{cm}$, $\angle P = 46^\circ$ and $PQ + PR = 5.1\text{cm}$.



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10. Construct a triangle PQR , such that $PQ = \frac{3}{8}\text{cm}$, $QR = 4.3\text{cm}$ and the median from Q to PR is 3.5cm .



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11. Construct $\triangle PQR$ in which $QR = 3.4\text{cm}$, $\angle P = 50^\circ$ and $PQ - PR = 1.2\text{cm}$.



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12. Construct $\triangle PQR$ in which $QR = 3.2\text{cm}$, $PQ + PR = 5.9\text{cm}$ and $\angle R - \angle Q = 60^\circ$



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13. Construct a triangle PQR in which $QR = 4.7$ cm
 $PR - PQ = 2.3$ cm and $\angle Q - \angle R = 50^\circ$.



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14. Construct $\triangle PQR$ in which
 $\angle P = 96^\circ$, $\angle Q = 40^\circ$ and $PQ + PR = 6$ cm.



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15. Construct a triangle PQR , such that
 $\angle P = 50^\circ$, $\angle Q = 30^\circ$ and $PQ - QR = 1.4$ cm.



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16. Construct a quadrilateral ABCD in which $AB=4.2\text{ cm}$,
 $\angle A = 80^\circ$, $BC = 2.4\text{cm}$, $CD = 3.3\text{cm}$ and
 $AD = 2.4\text{cm}$.



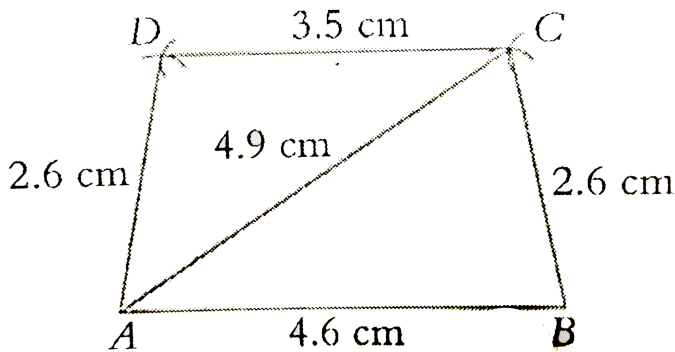
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17. Construct a quadrilateral ABCD with $AB=4\text{ cm}$,
 $BC=2.8\text{ cm}$, $CD=4\text{ cm}$, $\angle B = 75^\circ$ and $\angle C = 105^\circ$.



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18. Construct a quadrilateral ABCD in which $AB = 4.6$ cm , $BC = 2.6$ cm, $CD = 3.5$ cm, $AD = 2.6$ cm , and the diagonal $AC = 4.9$ cm.



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19. Construct a parallelogram ABCD, when $AB = 4$ cm, $BC = 2.5$ cm and $\angle B = 100^\circ$.



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20. Construct a parallelogram PQRS, when $PQ = 3.7\text{cm}$,
 $QR = 2.3\text{ cm}$ and $PR = 4.8\text{ cm}$.



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21. Construct a parallelogram PQRS with $PR = 3\text{ cm}$,
 $QS = 4.2\text{ cm}$, and the angle between the diagonals are
equal to 75° ,



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22. Construct a rectangle PQRS with $PQ=5.2$ cm and $QR=2.6$ cm.



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23. Construct a rectangle PQRS with $PQ=5.3$ cm and a diagonal $PR=5.8$ cm.



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24. Construct a rectangle PQRS, such that $PR=5.2$ cm and the angle between the diagonals is 50° .



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25. Construct a square of side 3 cm.



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26. Construct a square with its diagonal as 4cm .



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27. Construct a rhombus PQRS with $PQ=3.6\text{ cm}$ and $\angle P = 50^\circ$.



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28. Construct a rhombus PQRS, such that $PQ=3.2$ cm and $PR=4.2$ cm.



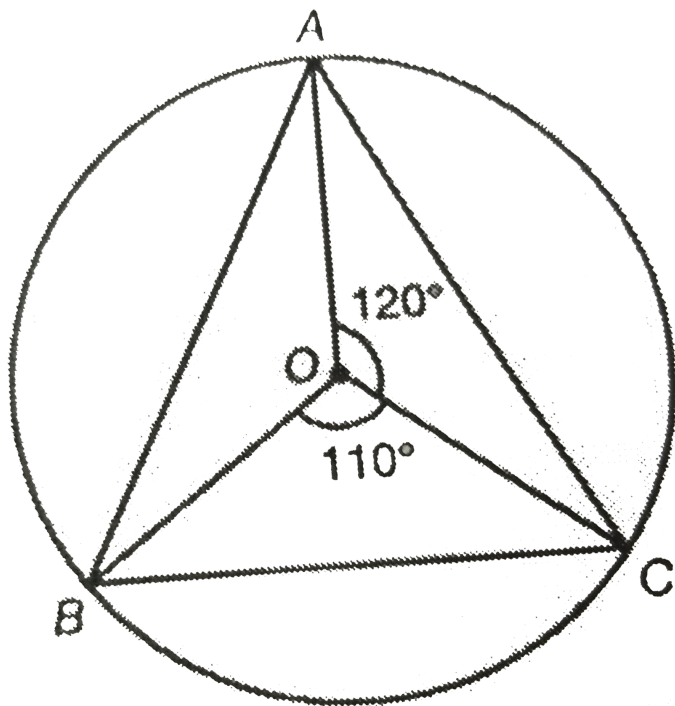
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29. Construct a rhombus $PQRS$ with diagonal $PR = 3.4cm$ and $QS = 3.6cm$.



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30. In Fig, O is the center of the circle. Find the angle of $\triangle ABC$.



A. 55° , 60° , 65°

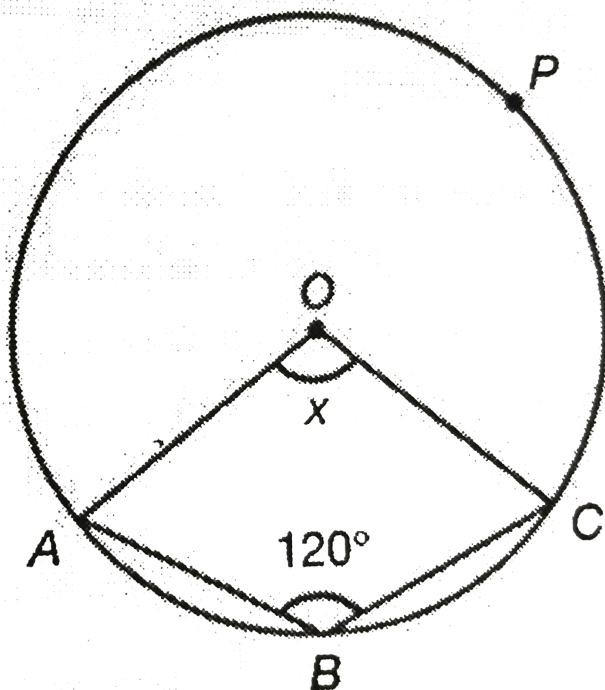
B. 50° , 65° , 45°

C. 35° , 50° , 75°

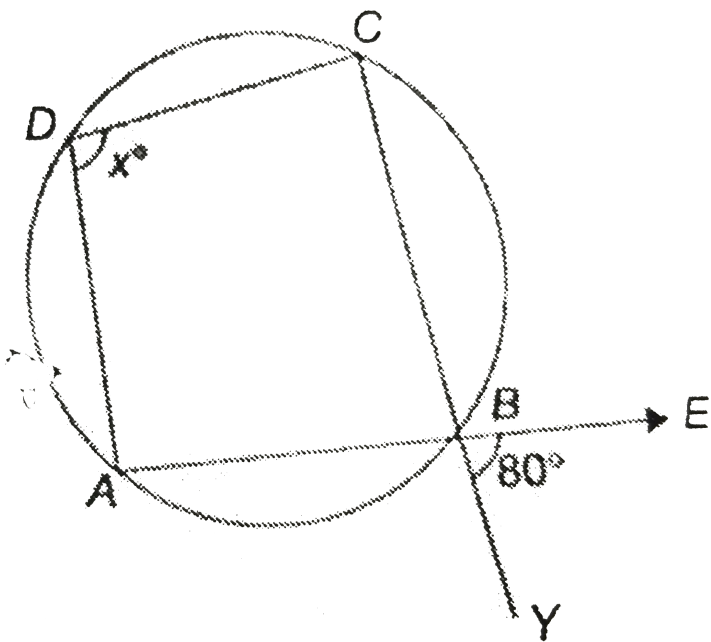
D. 60° , 65° , 65°

Answer: A

31. In fig. O is the center of the circle. Find the value of x .



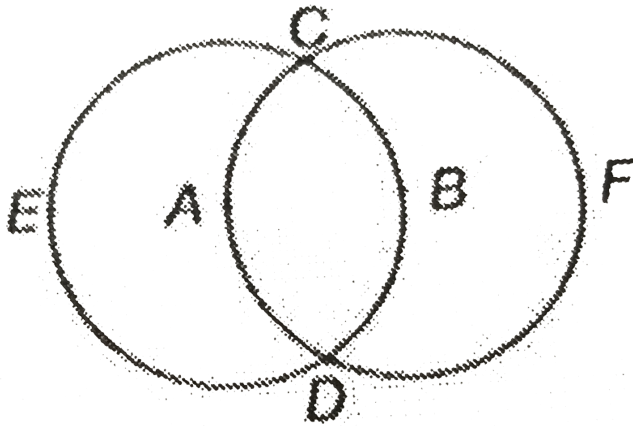
32. In Fig, find the value of x .



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33. A and B are the centers of the circles as shown in the given figure. The circles intersect at C and D. Find

$$\angle CED + \angle CFD.$$



A. 90°

B. 135°

C. 120°

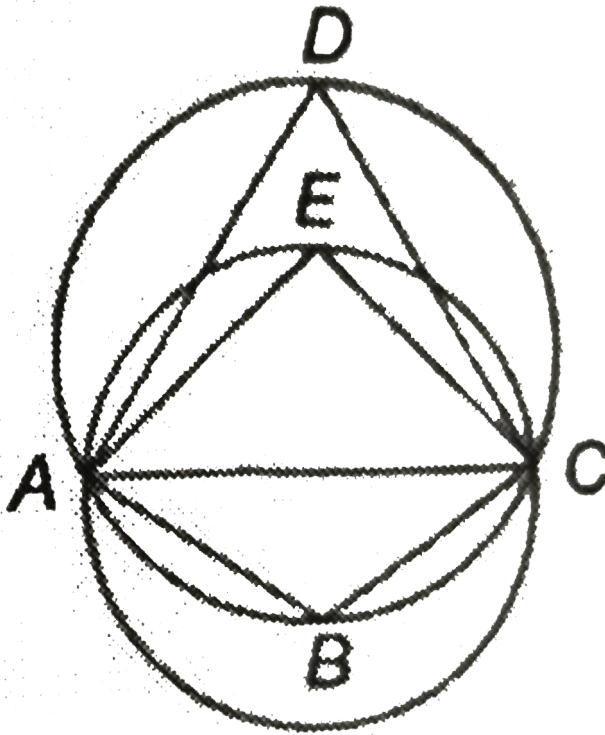
D. 150°

Answer:



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34. In the given figure, AC is the diameter of the circle on which the point E lies. A, B, C and D are concyclic. If $\angle ADC = 55^\circ$, find the sum of $\angle DAE$ and $\angle DCE$.



A. 35°

B. 55°

C. 45°

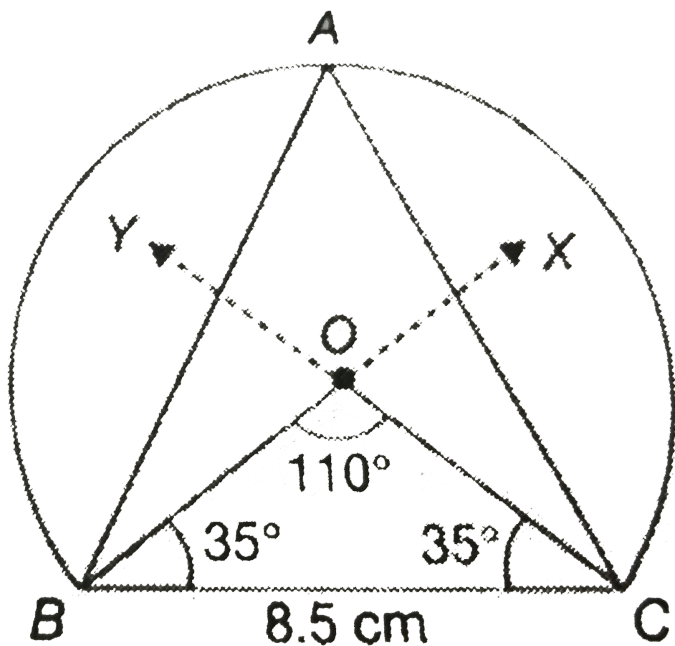
D. 65°

Answer:



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35. Construct a segment of a circle with a chord of length 8.5cm and containing an angle of 55° .



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Test Your Concepts

1. Can a triangle be formed by line segment of lengths a, b and c , such that $a > b - c$?



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2. Can a triangle be formed by line segment of lengths a, b and c , such that $a = b - c$?



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3. The area of parallelogram on the same base and between the same parallel lines are



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4. In a regular polygon, are all the exterior angles equal ?



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5. Can the sum of the two angles of a triangle be less than the third angles?



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6. If all the sides of a polygon are equal, then all its interior angles must be equal. Is the given statement true?



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7. If a circle passes through four points, then the four points are said to be.....



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8. Two circles cannot intersect in more than two points [True/False].



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9. Two quadrilaterals of equal perimeters occupy equal areas. Is this statement always true?



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10. Can a polygon have the sum of all its interior angles equal to 810° ?



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11. The exterior angle of a regular polygon is 60° . The number of sides of the polygon is.....



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12. A line l intersects a pair of parallel lines. The exterior angles on the same side of line l are in the ratio of $5:4$. The measure of the bigger angle of the two is.....



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13. If all the sides are equal , then the quadrilateral must be _____



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14. In a quadrilateral, ABCD, $\angle DAB + \angle BCD = 180^\circ$, then the quadrilateral ABCD is.....



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15. If four lines intersect in a plane, at the maximum how many triangles are formed?



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16. If all the angles of a quadrilateral are equal, then all its sides must be equal. Is the above statement true?



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17. If lines l_1 , l_2 and l_3 pass through a point P, then they are called..... Lines.



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18. In an isosceles right triangle ABC, $\angle B = 90^\circ$ and $\overline{BD} \perp \overline{AC}$. Then $BD = \dots\dots\dots \left(\frac{AB}{2} / \frac{BC}{2} / \frac{AC}{2} \right)$.



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19. The sum of all the altitudes in a triangle is the sum of all the sides. (equal to/less than/greater than).



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20. An angle is $\frac{2}{3}$ times its supplementary angle. What is the angle?



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21. Two lines AB and CD intersect at point O.
 $\angle AOD : \angle BOD = 3 : 1$, then

$$\angle AOD = \dots\dots\dots$$



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22. Are the diagonals of a regular polygon equal in length?



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23. In a triangle ABC , is $\angle B > \angle C$, then $AB > AC$.
Is the given statement true?



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24. Can the length of the median in a triangle to a side be less than the corresponding altitude?



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25. If d is the distance from a point P to the center of the circle of radius r and $d - r > 0$, then the point P lies..... the circle. (outside/inside/on)



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26. If the longest chord of a circle is of length 14 cm, then the circumference of the circle is..... cm.



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27. In a triangle, ABC , D is a point on BC , such that AD is the shortest distance from A to BC and $\angle ADC = 70^\circ$. Is it possible?

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28. Can the exterior angle of a polygon be three times its interior angle?

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29. If AB and CD are two chords of a circle and $AB > CD$, then the chord which is nearer to the center is.....

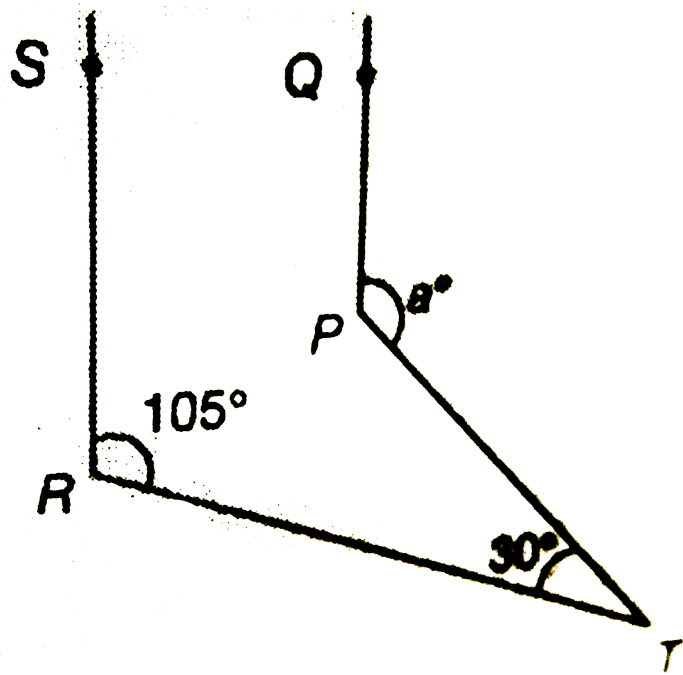


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Short Answer Type Questions

1. In the following figure, $PQ \parallel RS$, if $\angle TRS = 105^\circ$, $\angle PTR = 35^\circ$, $\angle QPT = a^\circ$, find

the value of a .



- A. $a = 155^\circ$
- B. $a = 165^\circ$
- C. $a = 135^\circ$
- D. $a = 175^\circ$

Answer: C



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2. In a triangle ABC , $\angle A < \angle B$, $\angle B > \angle C$ and $\angle A = 2\angle C$, prove that $AC > BC > AB$.



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3. If two complementary angles are in the ratio 7:11, find the supplement of the bigger angle.

A. 105°

B. 115°

C. 125°

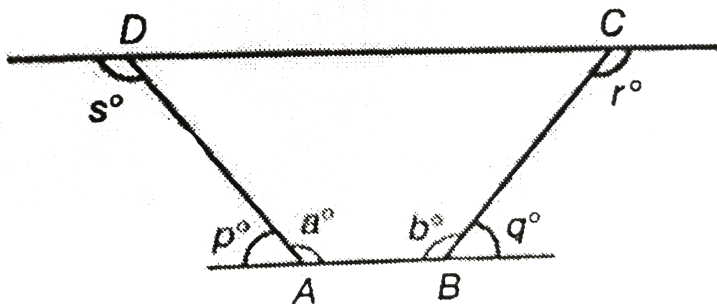
D. 135°

Answer: C

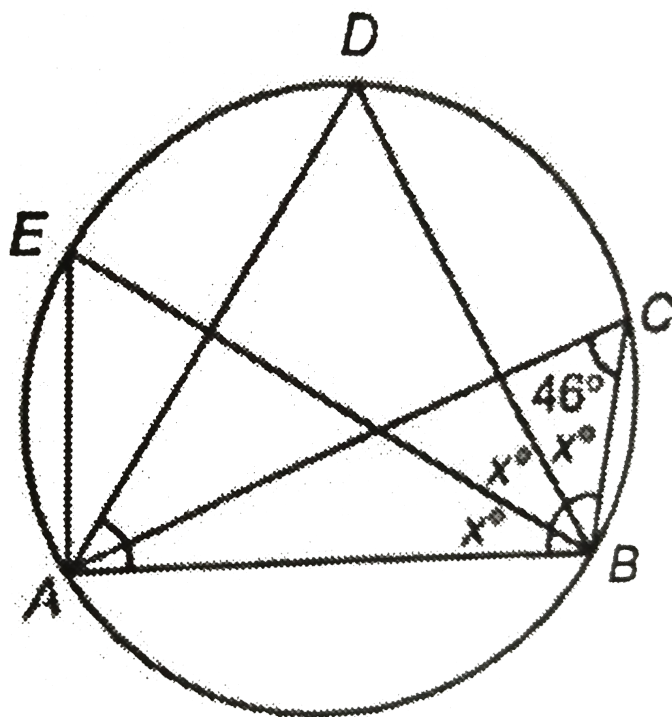


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4. In the given quadrilateral ABCD, $p^\circ + q^\circ = 100^\circ$, $a^\circ = 140^\circ$ and $r^\circ = \frac{1}{2}(a^\circ + q^\circ)$. Find the angles $p^\circ, q^\circ, r^\circ$ and s° .

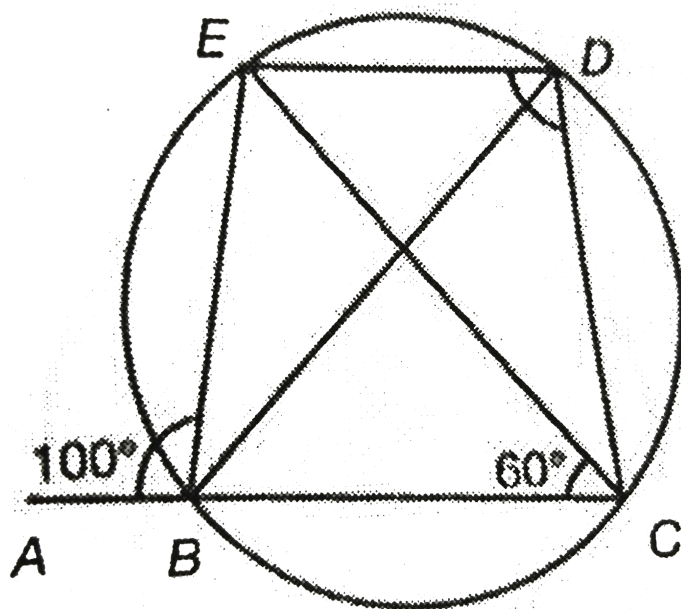


5. In the following figure, BE is the diameter of the circle. Find the value of x and $\angle DAB$.



6. In the following figure, \overline{CB} is produced to the point

A. Find $\angle BDC$.



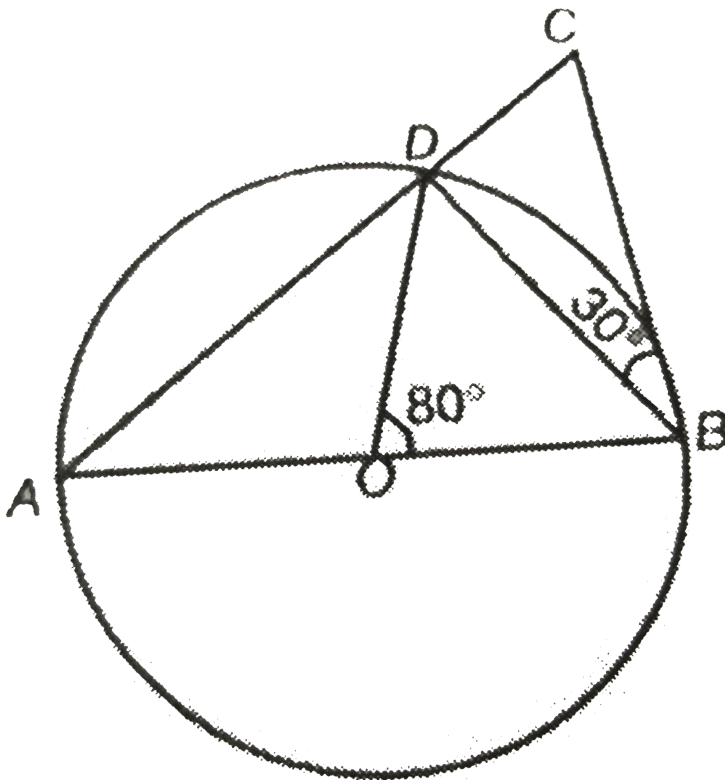
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7. If the sum of the interior angles of a polygon is 2340° , then find the number of sides of the polygon.

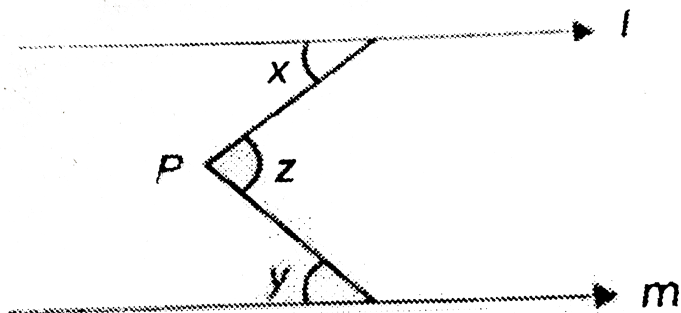


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8. In the following figure, if O is the center of the circle and \overline{AB} is the diameter, then find $\angle ACB$.



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9.

In the above figure, find the values of z , if x is two-third of y which is a complement of 45° .

A. 45°

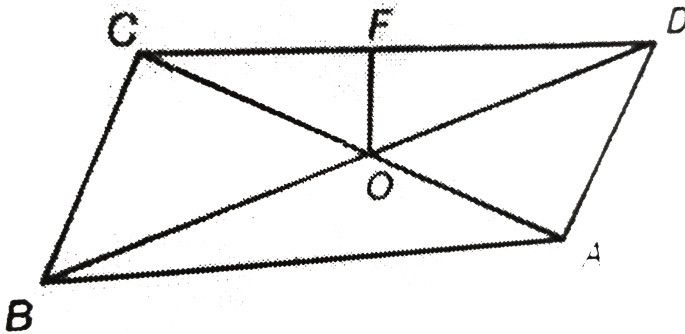
B. 55°

C. 65°

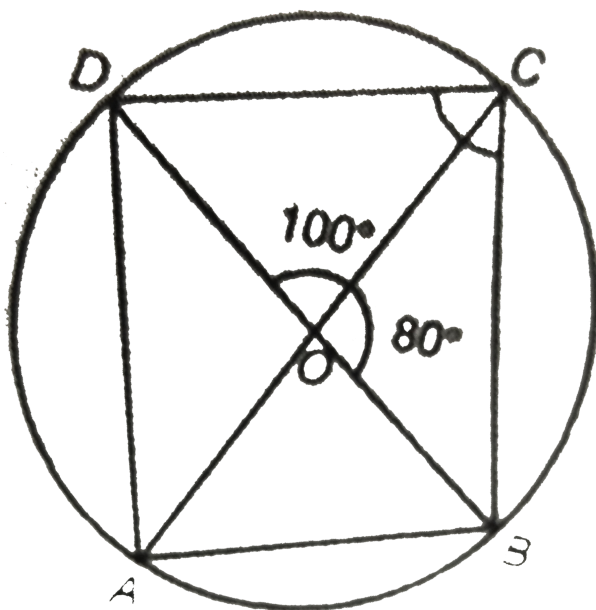
D. 75°

Answer: D

10. Find the length of the sides of a given parallelogram, if the perimeter of the parallelogram is 24 cm, the length of perpendicular $OF=3\text{cm}$, $OB=5\text{ cm}$ and $OC=\sqrt{18}\text{cm}$.



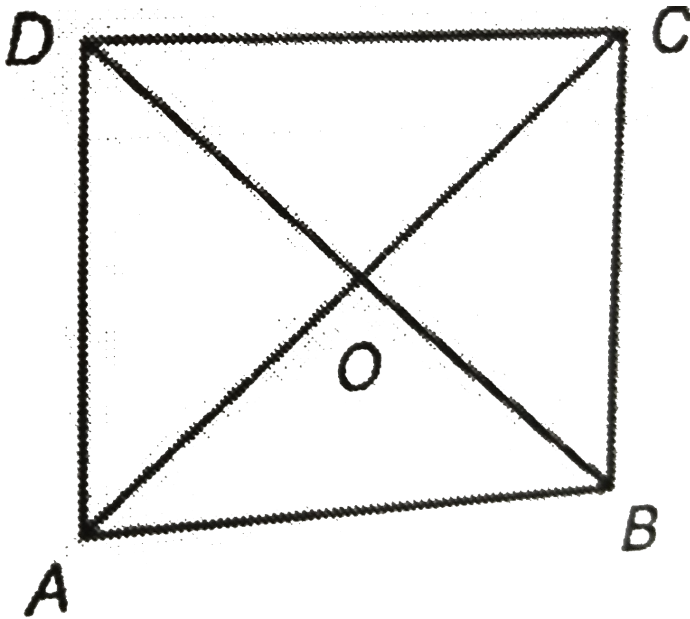
11. In the figure given below, $OD=OC=OB$. Find $\angle DCB$.



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12. If the sum of the lengths of two diagonals of the given square $ABCD$ is 24 cm, then find the side of the

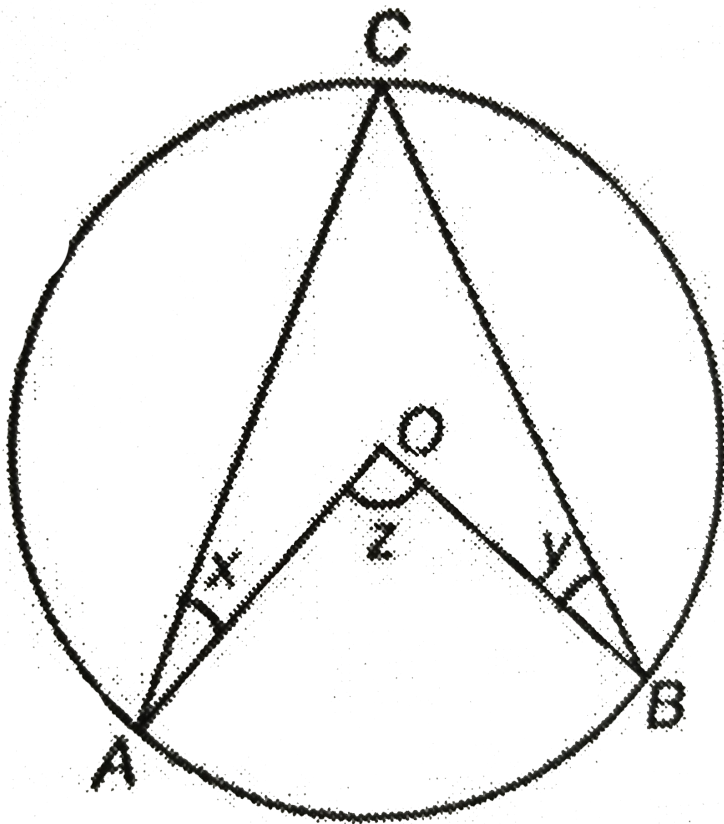
square and the magnitude of $AO + OB$.



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13. In the following figure, O is the center of the circle.

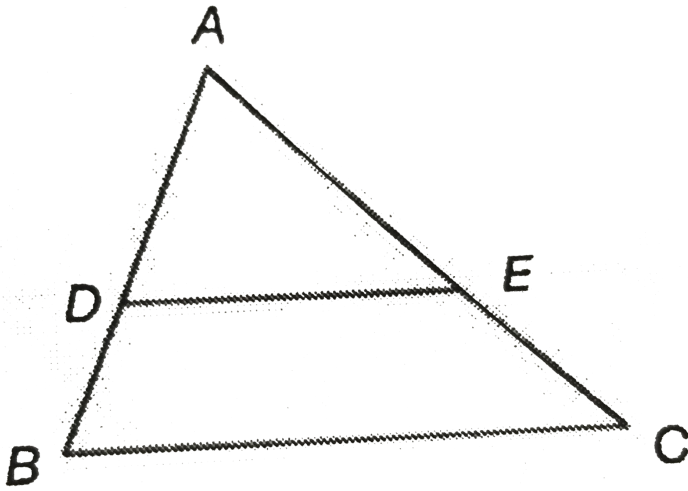
If $x = 40^\circ$ and $x : y = 4 : 3$, find the value of z .



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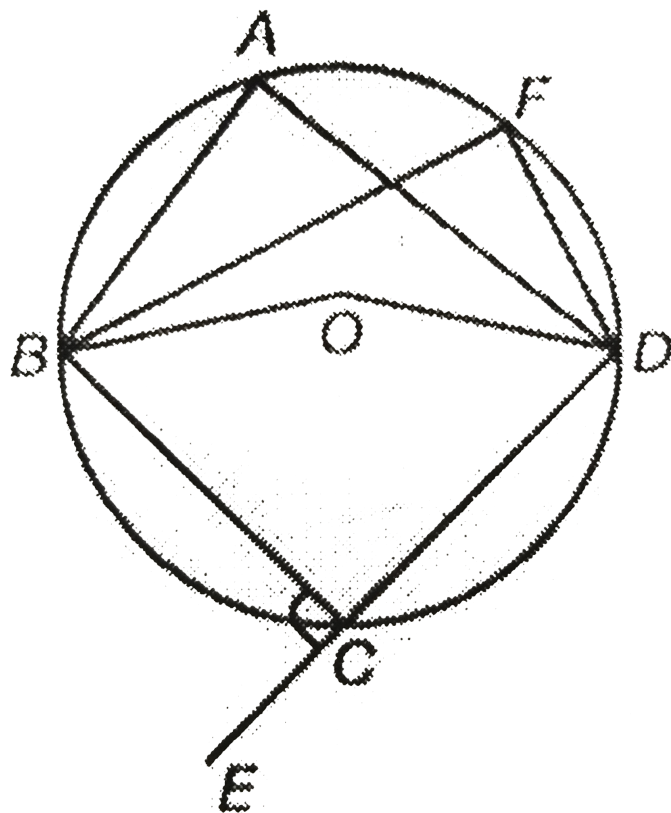
14. In the following figure, $AD=5.6$ cm, $AE=(x+1)cm$, $AB=8.4cm$ and $EC=(x-1)cm$, find

AC. Given that $DE \parallel BC$.



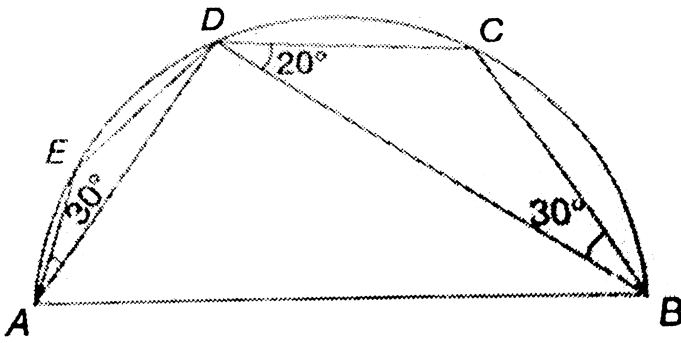
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15. ABCD and BFDC are cyclic quadrilaterals. \overline{CD} is produced to E. If $\angle BCE = 45^\circ$, then find $\angle BFD$.



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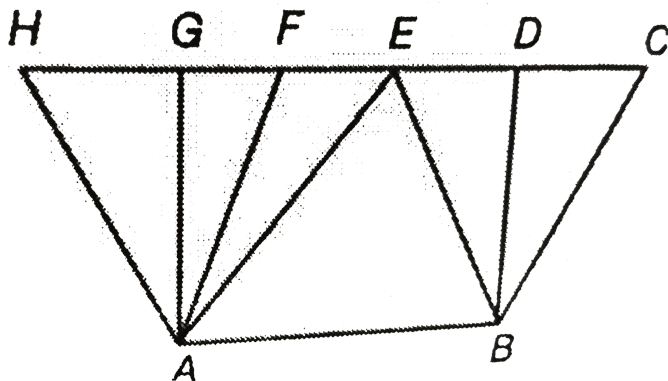
16. Find $\angle DBA$, $\angle DAB$ and $\angle AED$ in the following figure, where ABCDE is a semi-circle.



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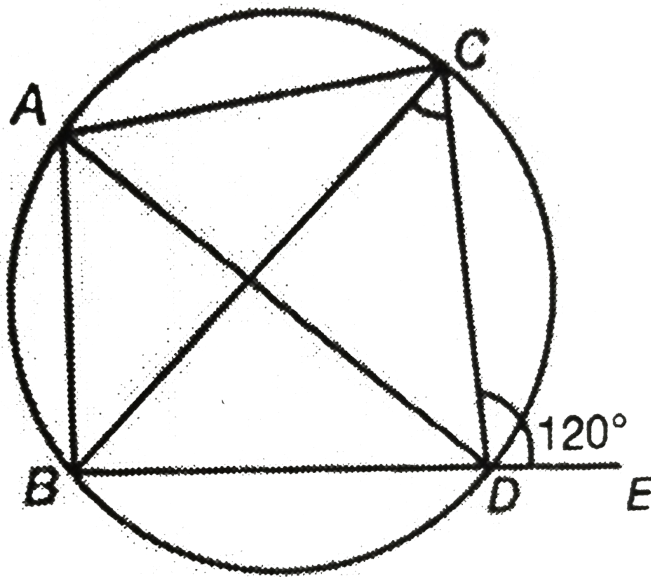
17. In the following figure, $ABDG$ is a rectangle with $AB=10$ cm and $AG=6$ cm. Find the areas of parallelogram $ABCF$ and $ABEH$. Also find the area of

$\triangle AEB$.



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18. In the following figure, \overline{BD} is produced to E. If \overline{AD} is the angle bisector of $\angle A$, then find the $\angle BCD$.

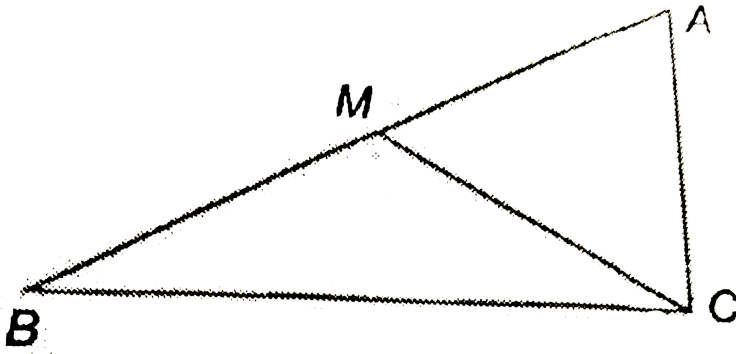


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Concept Application

1. In the adjoining figure, $\triangle ABC$ is right angled at C and M is the mid-point of hypotenuse AB , If $AC = 32cm$ and $BC = 60cm$, then find the length

of CM .



A. $32cm$

B. $30cm$

C. $17cm$

D. $34cm$

Answer: D



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2. A cyclic polygon has n sides such that each of its interior angle measures 144° . What is the measures of the angle subtended by each of its side at the geometrical center of the polygon.

A. 144°

B. 30°

C. 36°

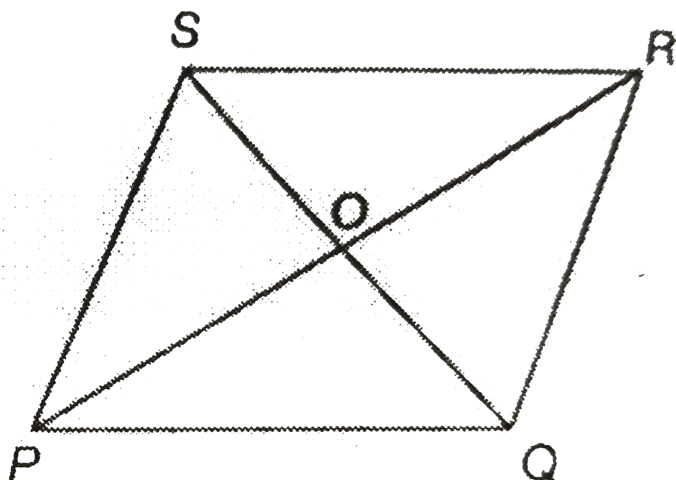
D. 54°

Answer: C



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3. In the following, $PQRS$ is a rhombus, SQ and PR are the diagonals of the rhombus intersecting at O . If angle $OPQ = 35^\circ$, then find the value of angle $ORS +$ angle OQP .



- A. 90°
- B. 180°
- C. 135°
- D. 45°

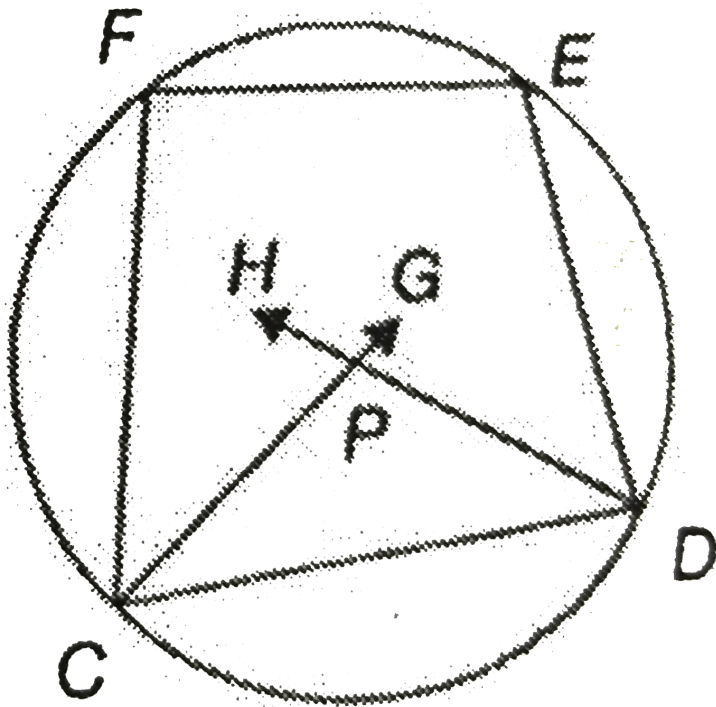
Answer: A



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4. In the following, CDEF is a cyclic quadrilateral. \overline{CG} and \overline{DH} are the angle bisectors of $\angle C$ and $\angle D$ respectively. If $\angle E = 100^\circ$ and $\angle F = 110^\circ$, then find

$\angle CPD$.

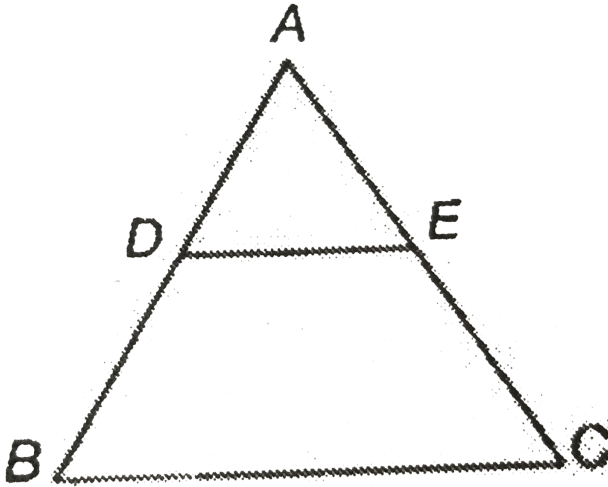


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5. In the following figure, ABC is an equilateral triangle. DE is parallel to BC and equal to half the

lengths of BC . If $AD + EC + CB = 24cm$, then

What is the perimeter of triangle ADE ?



A. $12cm$

B. $16cm$

C. $18cm$

D. Cannot be determined.

Answer: C

6. In $\triangle PQR$, M and N are points on PQ and PR , respectively, such that $\overline{MN} \parallel \overline{QR}$, If $PM = x$, $PR = x + 9$, $PQ = x + 13$ and $PN = x - 2$, then find x .

A. 10

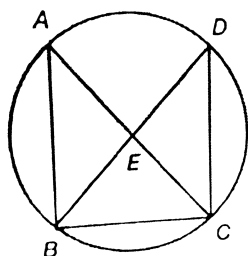
B. 11

C. 13

D. 15

Answer: C

7. In the following figure (not to scale), the chords AC and BD intersect at E and $\angle BAE = \angle ECD + 20^\circ$. If $\angle CDE = 60^\circ$, find $\angle ABE$.



A. 40°

B. 60°

C. 80°

D. None of these

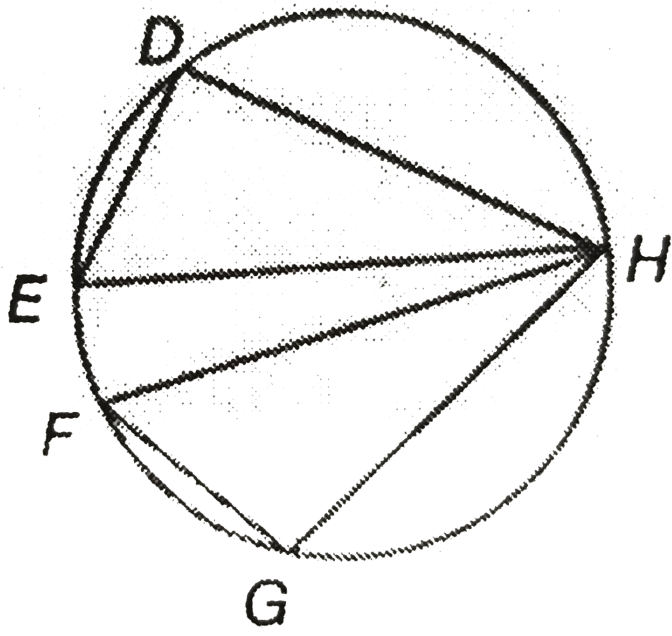
Answer: A



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8. In the following figure, \overline{DE} and \overline{FG} are equal chords of the circle subtending $\angle DHE$ and $\angle FHG$ at the point H on the circle. If $\angle DHE = 23\left(\frac{1}{2}\right)^2$,

then find $\angle FHG$.



- A. $\frac{271}{2}^\circ$
- B. 30°
- C. $23\left(\frac{1}{2}\right)^\circ$
- D. 60°

Answer: C



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9. The bisector of two adjacent angles in a parallelogram meet at a point P inside the parallelogram. The angle made by these bisectors at a point is

A. 180°

B. 90°

C. 45°

D. None of these

Answer: B

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10. If x° is the measure of an angle which is equal to its complement and y° is the measure of an angle which is equal to its supplement, then $\frac{x^\circ}{y^\circ}$ is.....

A. 1

B. 3

C. 0.5

D. 2

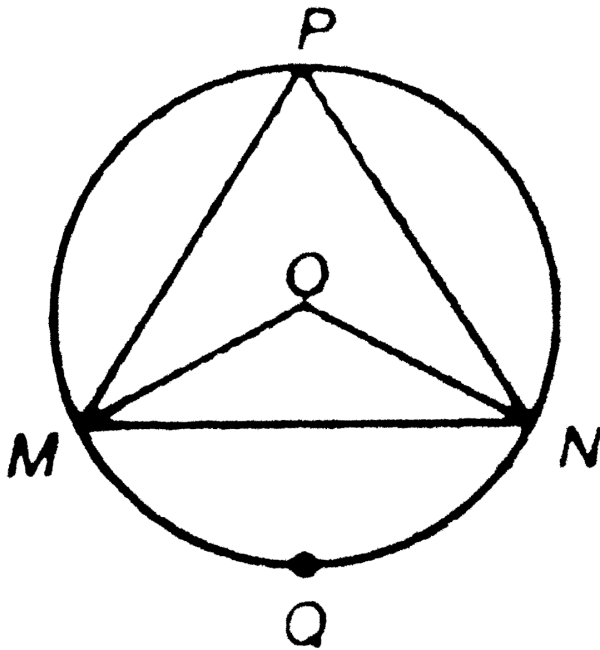
Answer: C

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11. In the following figure, O is the center of the circle.

If $\angle MPN = 55^\circ$, then find the value of

$$\angle MON + \angle OMN + \frac{1}{2}\angle MNO.$$



A. 145°

B. $162\left(\frac{1}{2}\right)^\circ$

C. $158\left(\frac{1}{2}\right)^\circ$

D. 180°

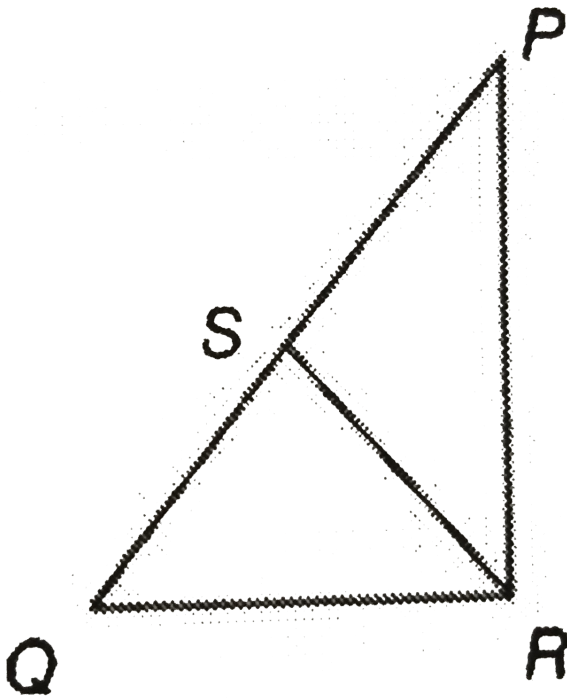
Answer: B



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12. In the following figure, $\triangle PQR$ is right-angled at R and S is the mid-point of hypotenuse PQ . If

$RS = 25\text{cm}$ and $PR = 48\text{cm}$, then find QR .



A. 7cm

B. 25cm

C. 14cm

D. Cannot be determined.

Answer: C



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13. In a cyclic quadrilateral $PQRS$, $PS = PQ$, $RS = RQ$ and $\angle PSQ = 2\angle QSR$, Find $\angle QSR$.

A. 20°

B. 30°

C. 40°

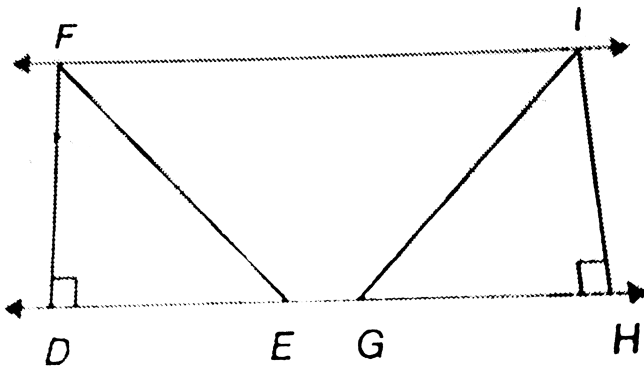
D. 50°

Answer: B



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14. In the following figure, two isosceles right angled triangles, DEF and HGI are on the same base \overline{DH} and \overline{DH} is parallel to \overline{FI} . If $DE=GH=9$ cm and $DH=20$ cm, then the area of the quadrilateral $FEGI$ is.....



A. 99 cm^2

B. 40.5 cm^2

C. 81cm^2

D. 180cm^2

Answer: A



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15. A pole of height 14m casts a 10m long shadow on the ground. At the same time, a tower casts a 70m long shadow on the ground. Find the height of the tower.

A. 50m

B. 78m

C. $90m$

D. $98m$

Answer: D



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16. The angle subtended by a minor arc in its alternate segment is.....

A. acute

B. obtuse

C. 90°

D. reflex angle.

Answer: A



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17. The number of diagonals of a regular polygon is 27. Then, each of the interior angles of the polygon is.....

A. $\left(\frac{500}{3}\right)^{\circ}$

B. 140°

C. 128°

D. 154°

Answer: B



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18. ABC is a triangle inscribed in a circle, AC being the diameter of the circle. The length of AC is as much more than the length of BC as the length of BC is more than the length of AB. Find AC:AB.

A. 5:3

B. 5:4

C. 6:5

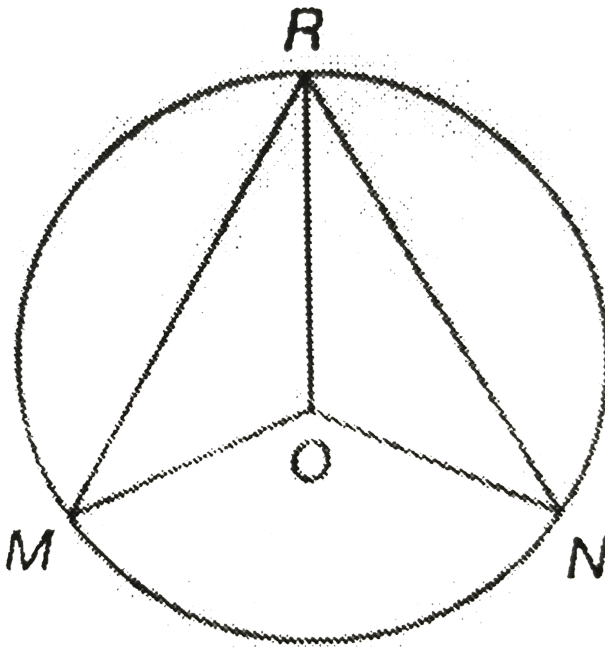
D. 3:2

Answer: A

19. $\frown (MN)$ is the arc of the circle with centers O. If

$\angle MOR = 100^\circ$ and $\angle NOR = 135^\circ$, then

$\frac{1}{2}\angle ORN + \frac{1}{4}\angle ORM$ is.....



A. $22\left(\frac{1}{2}\right)^\circ$

B. 40°

C. 125°

D. $21\left(\frac{1}{4}\right)^\circ$

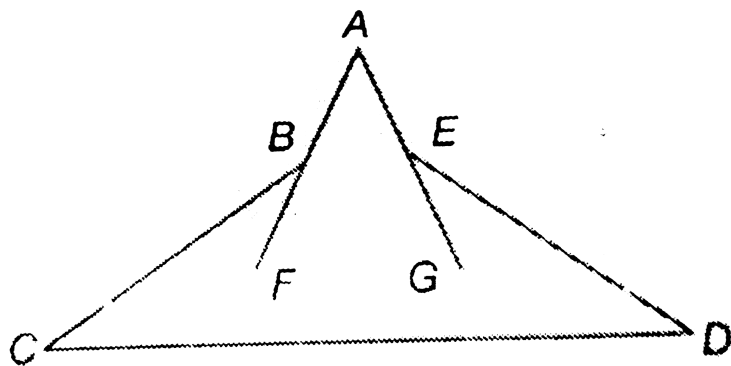
Answer: D



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20. In the following figure (not be scale),
 $\angle BCD = 40^\circ$, $\angle EDC = 35^\circ$, $\angle CBF = 30^\circ$ and

$\angle DEG = 40^\circ$, Find $\angle BAE$.



A. 70°

B. 50°

C. 110°

D. 35°

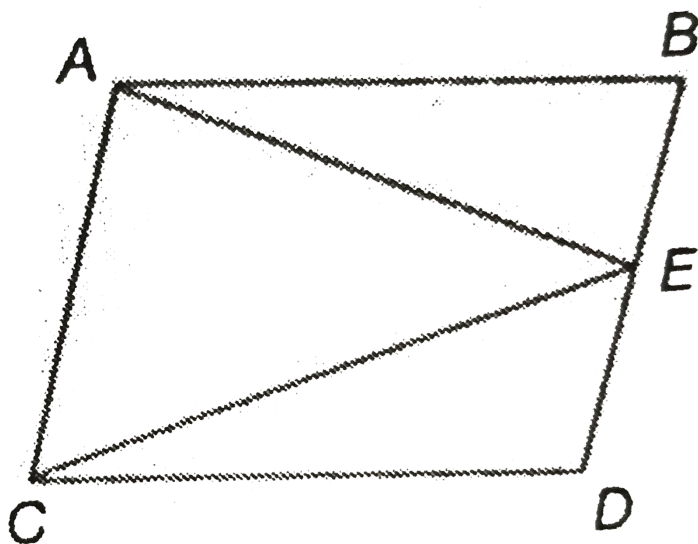
Answer: D



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21. In the following figure (not to scale), $\overline{AB} \parallel \overline{CD}$.

If $\angle BAE = 25^\circ$ and $\angle DCE = 30^\circ$, then find $\angle AEC$.



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22. A tower of height 60 m casts a 40 m long shadow on the ground. At the same time, a needle of height 12

m casts a x cm long shadow the ground. Find x

A. 6

B. 8

C. 10

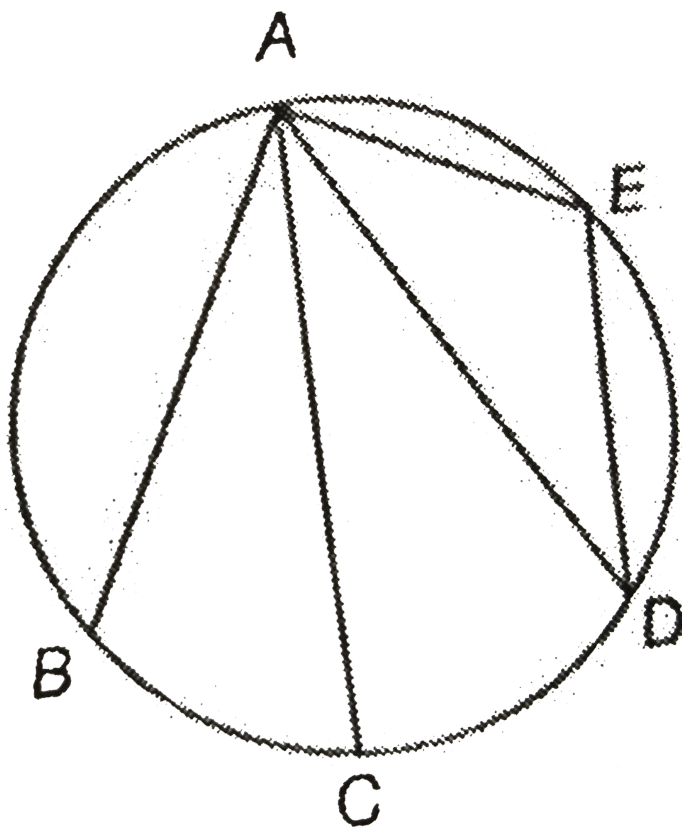
D. 14

Answer: B



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23. In the given figure, AC is the diameter, AB and AD are equal chords. If $\angle AED = 110^\circ$, then find $\angle BAD$.



A. 40°

B. 55°

C. 110°

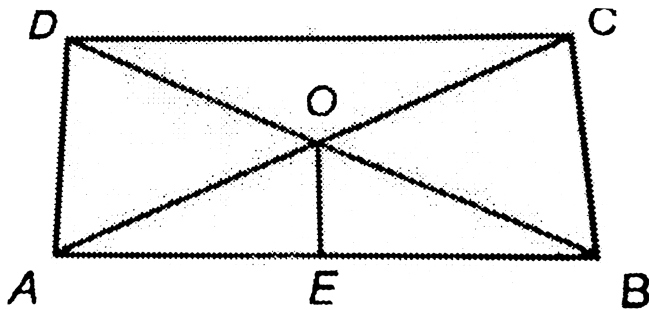
D. 120°

Answer: A



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24. In the given rectangle ABCD, the sum of the lengths of two diagonals is equal to 52 cm and E is a point in AB, such that \overline{OE} is perpendicular to \overline{AB} . Find the lengths of the sides of the rectangle, if $OE=5$ cm.



A. 24cm, 10cm

B. 12cm , 10cm

C. 24cm , 5cm

D. 12cm , 15cm

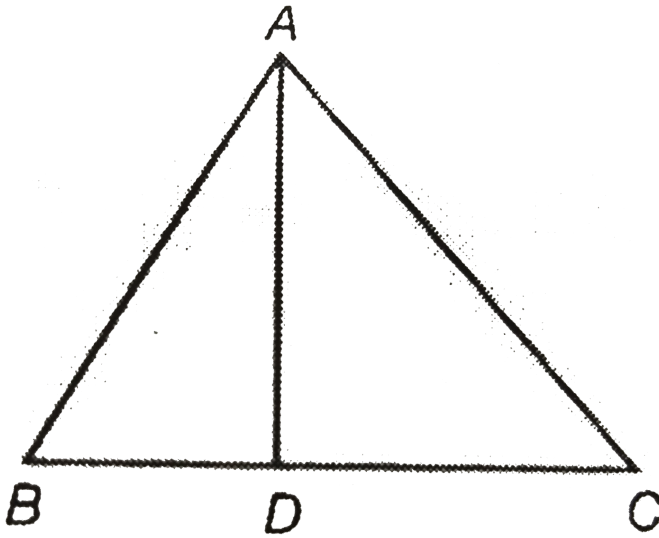
Answer: A



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25. In the following figure (not to scale), AD bisects $\angle BAC$. If $\angle BAD = 45^\circ$ is inscribed in a circle, then

which of the following is the longest?



A. AB

B. AD

C. AC

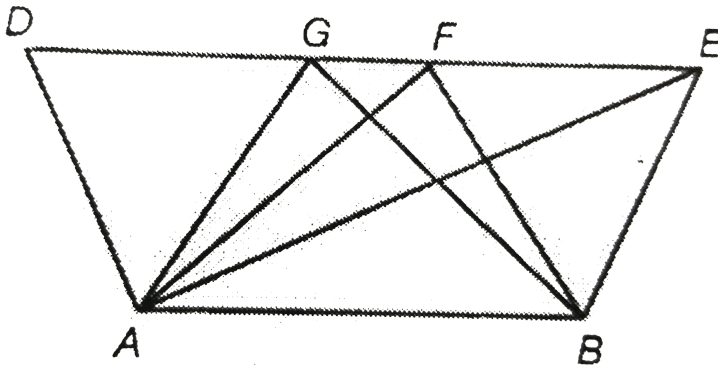
D. BC

Answer: D



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26. In the given figure, $\overline{AB} \parallel \overline{DE}$ and area of the parallelogram ABFD is 24 cm^2 . Find the areas of $\triangle AFB$, $\triangle AGB$ and $\triangle AEB$.



A. 8 cm^2

B. 12 cm^2

C. 10 cm^2

D. 14 cm^2

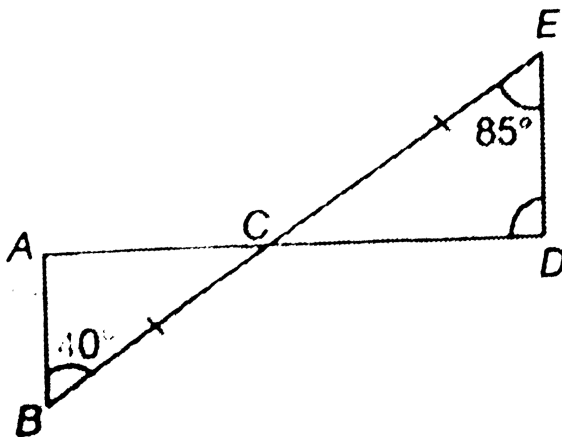
Answer: B



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27. In the given figure, \overline{AD} and \overline{BE} intersect at C , such that $BC = CE$, $\angle ABC = 40^\circ$ and $\angle DEC = 85^\circ$.

Find $\angle BAC - \angle CDE$.



A. 45°

B. 125°

C. 55°

D. 110°

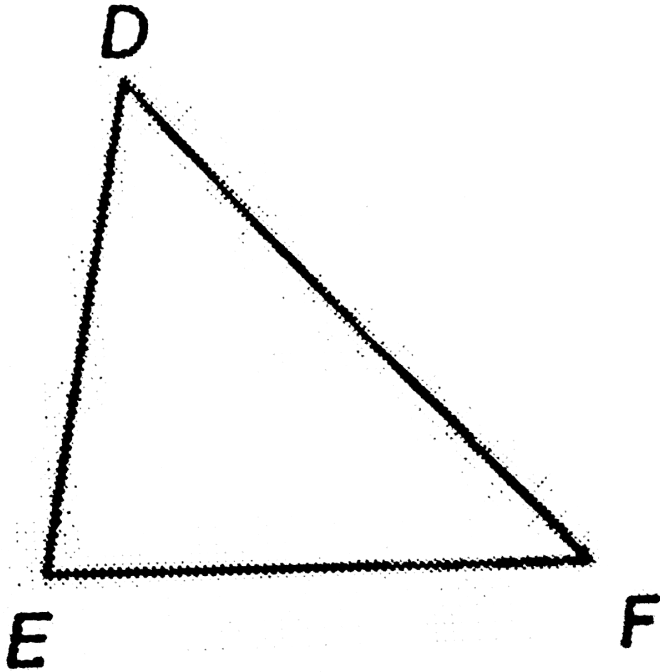
Answer: A



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28. In the given figure, DEF is a triangle. If DF is the longest side and EF is the shortest side, then which of

the following is true?



A. $\angle E > \angle D > \angle F$

B. $\angle D < \angle F < \angle E$

C. $\angle D < \angle E < \angle F$

D. none of these

Answer: B



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29. The ratio between the exterior angle and the interior angle of a regular polygon is $1:3$. Find the number of the sides of the polygon.

A. 12

B. 6

C. 8

D. 10

Answer: C



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30. Find each interior and exterior angle of a regular polygon having 30 sides.

A. 144° , 36°

B. 156° , 24°

C. 164° , 16°

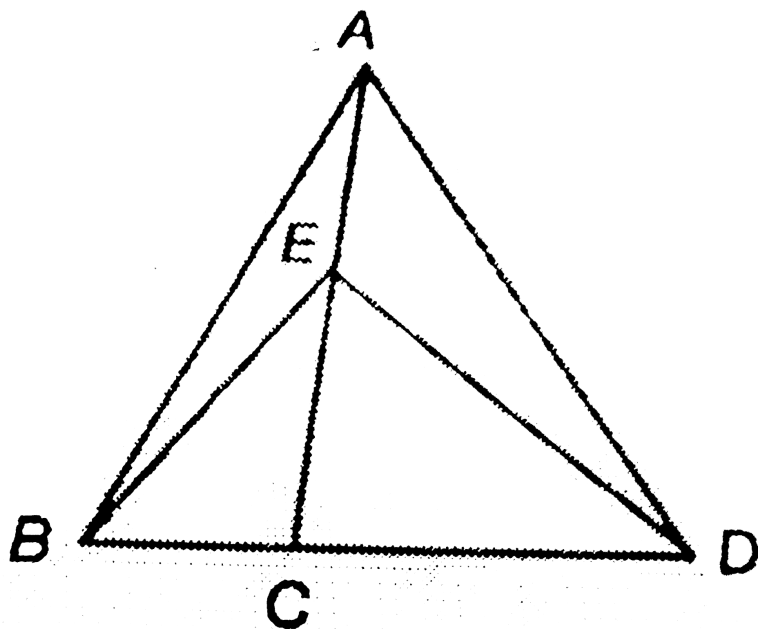
D. 168° , 12°

Answer: D



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31. If $BC:CD = 2:2$, $AE:EC = 2:3$, then find the ratio of the area of the $\triangle ECD$ to the area of $\triangle AEB$.



A. 2:1

B. 2:3

C. 3:5

D. 4 : 3

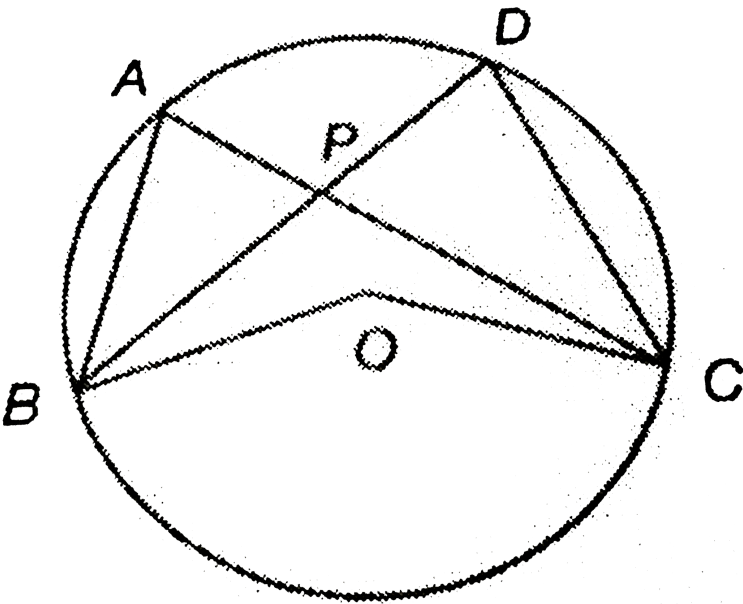
Answer: A



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32. In the given figure (not to scale), O is the center of the circle. If $PB=PC$, $\angle PBO = 25^\circ$ and $\angle BOC = 130^\circ$,

then find $\angle ABP + \angle DCP$.



- A. 10°
- B. 30°
- C. 40°
- D. 50°

Answer: B



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33. In a polygon, the greatest angle is 110° and all the angles are distinct in integral measures (in degrees). Find the maximum number of sides it can have.

A. 4

B. 5

C. 6

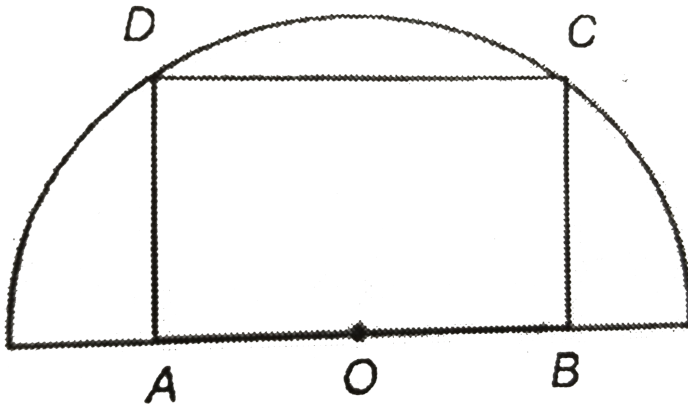
D. 7

Answer: B



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34. In the given figure, ABCD is a rectangle inscribed in a semi-circle. If the length and the breadth of the rectangle are in the ratio 2: 1. What is the ratio of the perimeter of the rectangle to the diameter of the semicircle?



A. $3: \sqrt{2}$

B. $2: \sqrt{3}$

C. $2: \sqrt{5}$

D. 3: $\sqrt{5}$

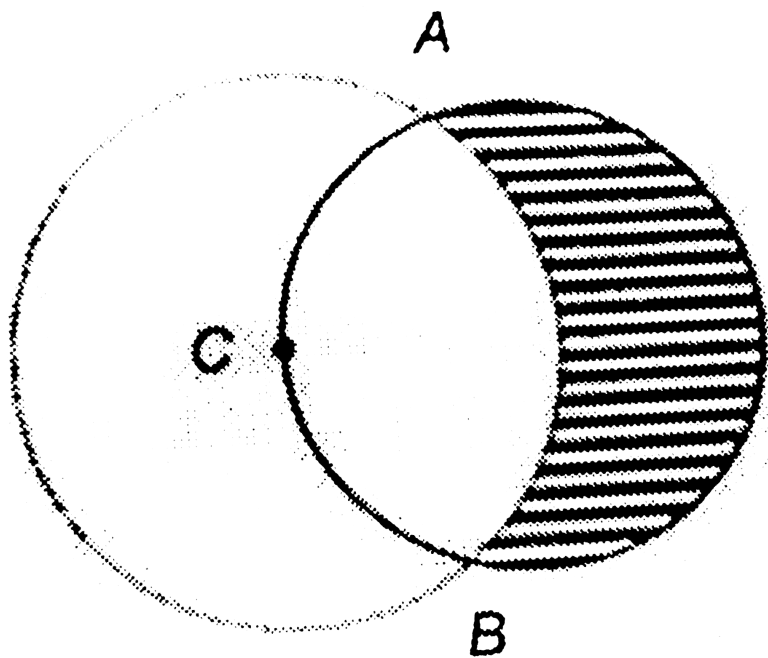
Answer: A



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35. In the given figure, \overline{AB} is the diameter of the circle with area π sq. units. Another circle is drawn with C as center, which is on the given circle and passing

through A and B. Find the area of the shaded region.



A. $\frac{\pi}{3}$ sq. units

B. $\frac{2\pi}{3}$ sq. units

C. 1 sq. units

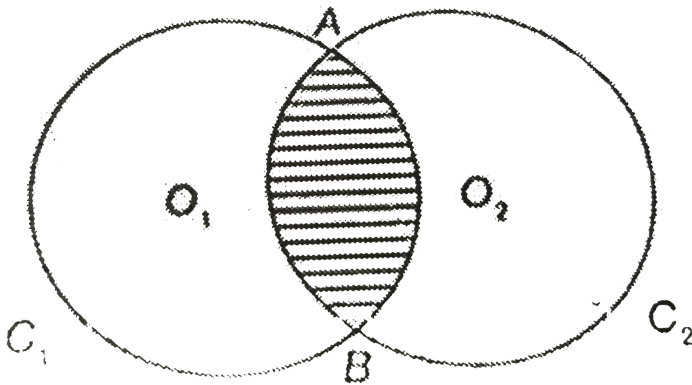
D. 1.2 sq units.

Answer: C



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36. In the following figure (not to scale), C_1 and C_2 are two congruent circles with centers O_1 and O_2 . Respectively. Each circle passes through the center of the other circle. If the circumference of each circle is 2cm, the perimeter of the shaded region is..... cm.



A. $\frac{4}{3}$

B. 1

C. $\frac{5}{3}$

D. $\frac{2}{3}$

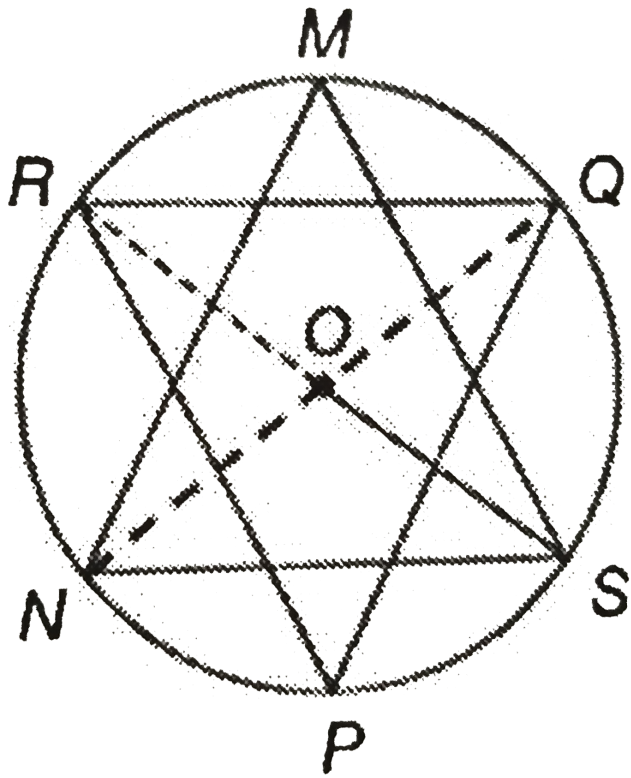
Answer: A



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37. In the given figure, (not to scale), the points M,R,
N,S and Q are concyclic. Find
 $\angle PQR + \angle OPR + \angle NMS + \angle OSN$, if O is the

center of the circle.



- A. 90°
- B. 180°
- C. 270°
- D. Data is inadequate.

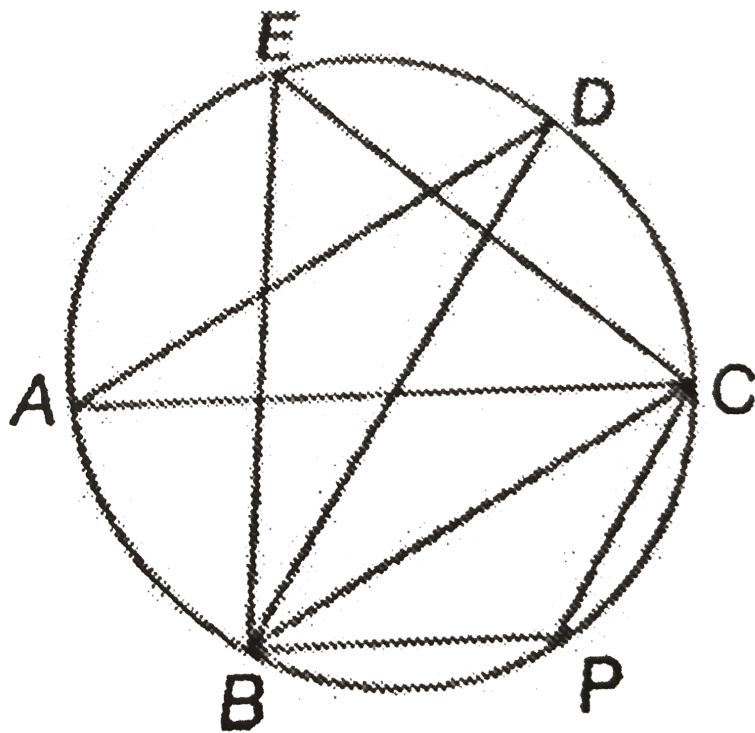
Answer: B



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38. In the given figure (not to scale), AC is the diameter of the circle and $\angle ADB = 20^\circ$, then find

$\angle BPC$.



A. 50°

B. 70°

C. 90°

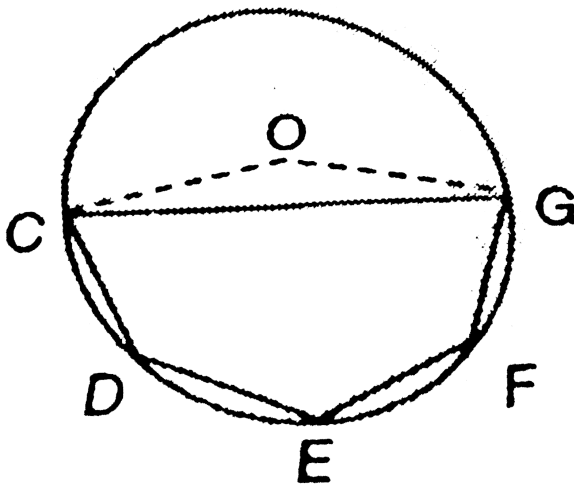
D. 110°

Answer: D



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39. In the following figure, O is the center of the circle and $CD=EF=GF$. If $\angle COD = 40^\circ$, then find reflex $\angle COG$.



A. 200°

B. 90°

C. 80°

D. 160°

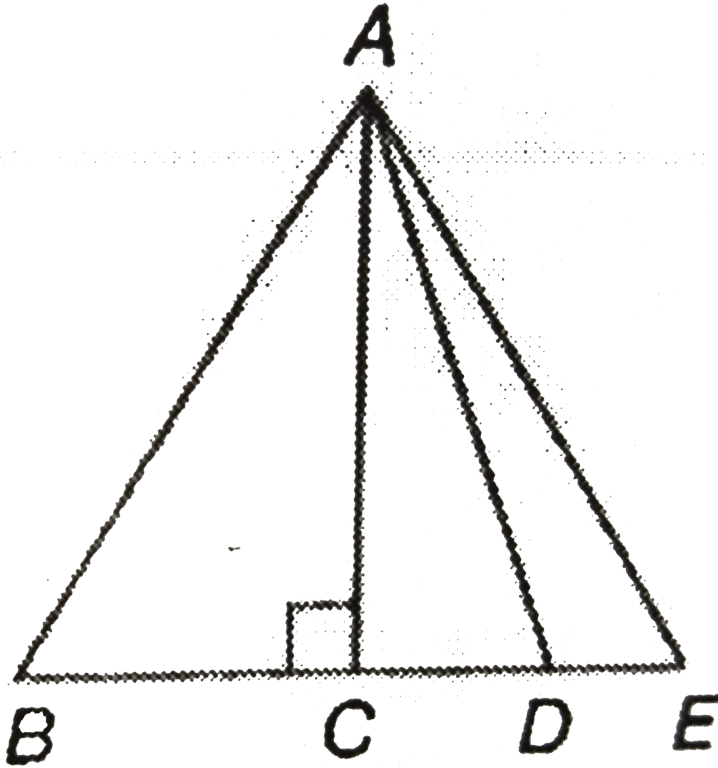
Answer: A



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40. In the given figure (not to scale), AC is the median as well as altitude to BD . In $\triangle ACE$, AD is the

median to CE. Which of the following is true?



A. $AB + CD > AE$

B. $AB + BC = AE$

C. $AB + DE < AE$

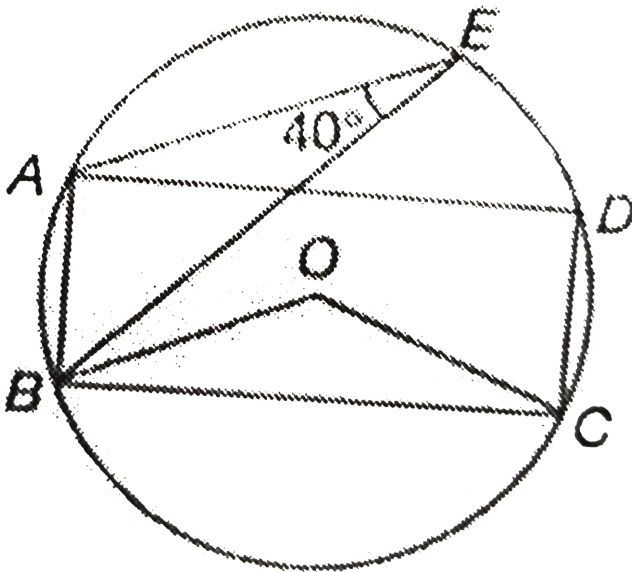
D. None of the above

Answer: A



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41. In the given figure, (not to scale), rectangle ABCD and triangle ABE are inscribed in the circle O. If $\angle AEB = 40^\circ$, then find $\angle BOC$.



A. 60°

B. 80°

C. 100°

D. 90°

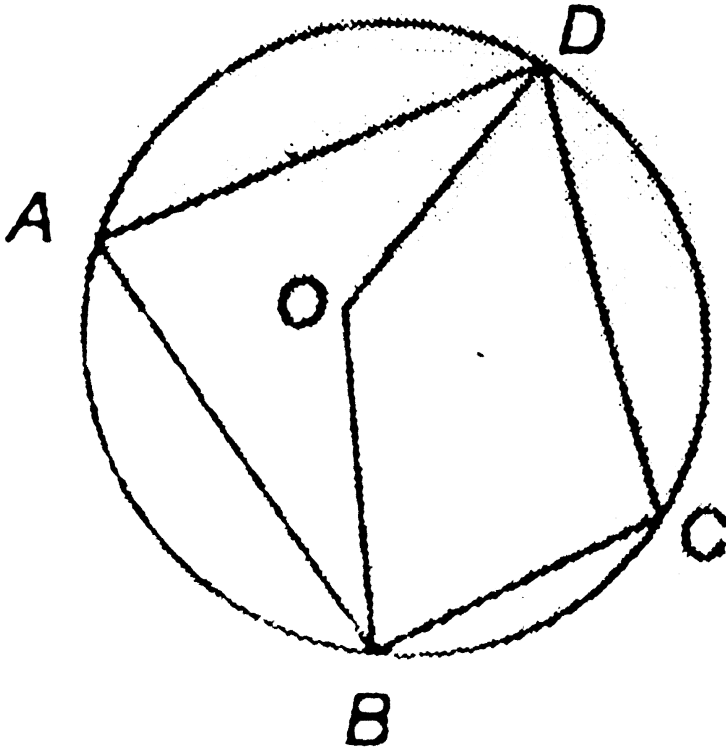
Answer: C



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42. In the given figure (not to scale), O is the center of the circle, BC and CD are equal chords. If

$\angle OBC = 55^\circ$, then find $\angle BAC$.



A. 60°

B. 70°

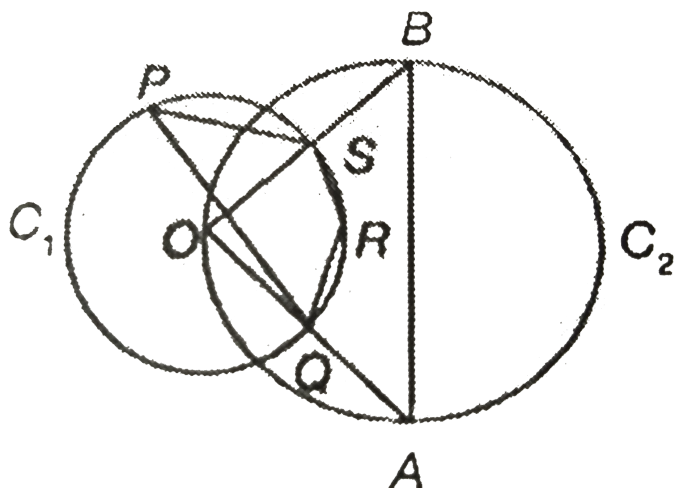
C. 80°

D. 90°

Answer: B

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43. In the given figure (not to scale), O is the center of the circle C_1 and AB is the diameter of the circle C_2 . Quadrilateral $PQRS$ is inscribed in the circle with center O . Find $\angle QRS$.



A. 105°

B. 115°

C. 135°

D. 145°

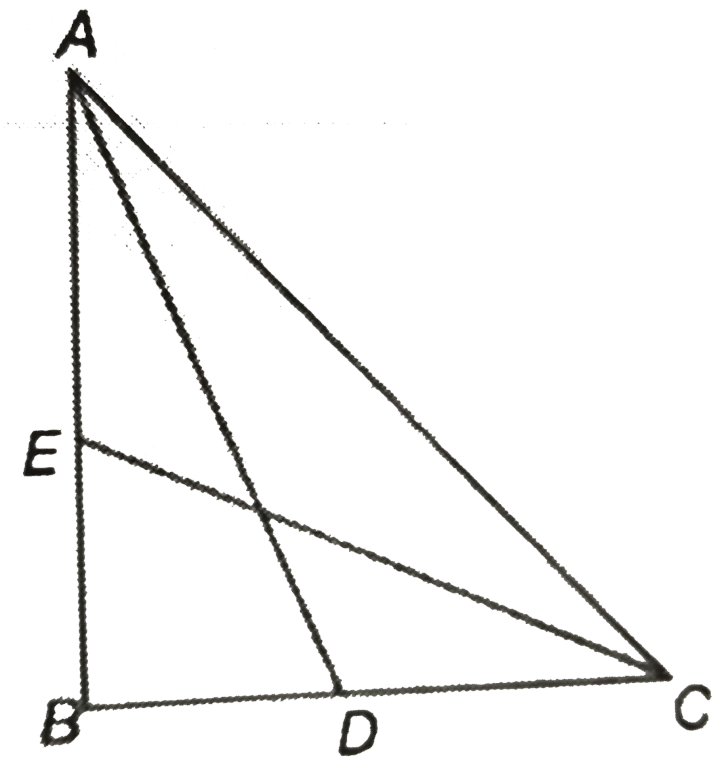
Answer: C



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44. In the given figure, (not be scale), E and D are the mid-points of AB and BC respectively. Also, $\angle B = 90^\circ$, $AD = \sqrt{292}$ cm and $CM = \sqrt{208}$ cm.

Find the AC .



A. 15

B. 18

C. 20

D. 24

Answer: C



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45. In $\triangle ABC$, P is the mid-point of BC and Q is the mid-point of AP. Find the ratio of the area of $\triangle ABQ$ and the area of $\triangle ABC$. The following are the steps involved in solving the above problem.

A) We know that a median of a triangle divides a triangle into two triangles of equal area.

$$B) \Rightarrow Ar(\triangle ABP) = \frac{1}{2}[Ar(\triangle ABC)]$$

C)

$$Ar(\triangle ABQ) = \frac{1}{2}[Ar(\triangle ABP)] = \frac{1}{4}[Ar(\triangle ABC)]$$

$$D) \Rightarrow (Ar(\triangle ABQ) : Ar(\triangle ABC)) = 1 : 4$$

A. ABCD

B. ADBC

C. ABCD

D. ADCB

Answer: B



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46. ABCD is a cyclic quadrilateral, ABC is a minor arc and O is the center of the circle. If $\angle AOC = 160^\circ$, then find $\angle ABC$.

The following are the steps involved in solving the

above problem. Arrange them in sequential order:

A) We have, $\angle ABC + \angle ADC = 180^\circ$

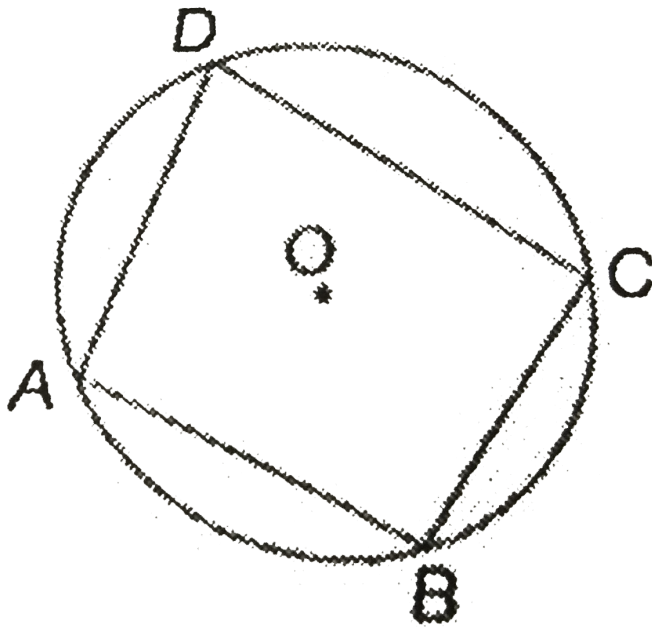
B)

$$\angle ABC + \frac{1}{2}\angle AOC = 180^\circ \left(\because \angle ADC = \frac{1}{2}\angle AOC \right)$$

C) $\angle ABC = 180^\circ - 80^\circ$

D) $\angle ABC + \frac{160^\circ}{2} = 180^\circ$

E) $\therefore \angle ABC = 100^\circ$.



A. ABDEC

B. ABDCE

C. BCDAE

D. BACDE

Answer: B



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47. Show that each diagonal of a parallelogram divide it into two congruent triangles.

The following are the steps involved in showing the above result. Arrange them in sequential order.

A) In $\triangle ABC$ and $\triangle CDA$, $AB=DC$ and $BC=AD$ (\therefore opposite angles of parallelogram) $AC=AC$ (common side).

B) Let ABCD be a parallelogram. Join AC.

C) By SSS congruence property, $\triangle ABC \cong \triangle CDA$.

D) Similarly, BD divides the triangle into two congruent triangles.

A. BACD

B. BDAC

C. BADC

D. BDCA

Answer: A



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48. Show that any angle in a semi-circle is a right angle.

The following are the steps involved in showing the above result. Arrange them in sequential order.

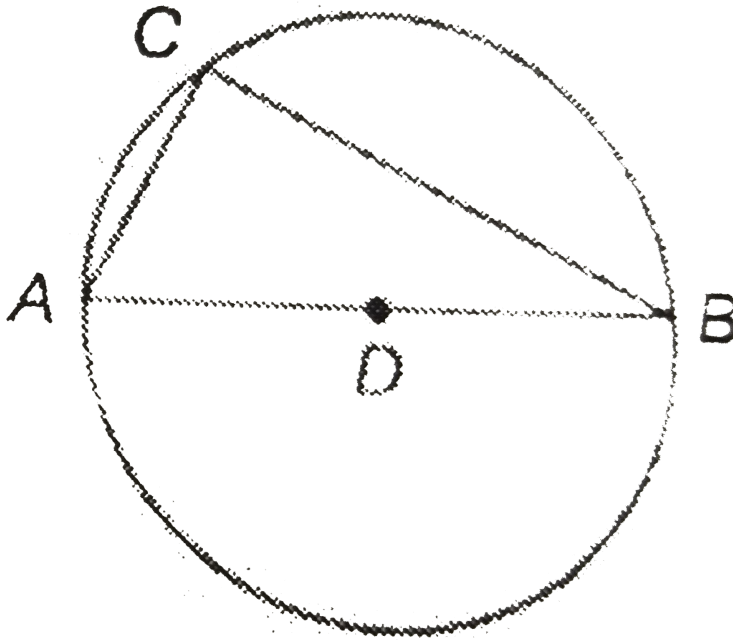
A) $\therefore \angle ACB = \frac{180^\circ}{2} = 90^\circ$

B) The angle subtended by an arc at the center is double of the angle subtended by the same arc at any point on the remaining part of the circle.

c) Let AB be a diameter of a circle with center D and C be any point on the circle. Join AC and BC.

D) $\therefore \angle ADB = 2 \times \angle ACB$

$$180^\circ = 2\angle ACB (\therefore \angle ADB = 180^\circ)$$



A. DBAC

B. DBCA

C. CBAD

D. CBDA

Answer: D



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49. A,B,C and D are concylic, AC bisects BD. If $AB = 9$ cm, $BC = 8$ cm, and $CD = 6$ cm, then find the measure of AD.

A. 7 cm

B. 10 cm

C. 12 cm

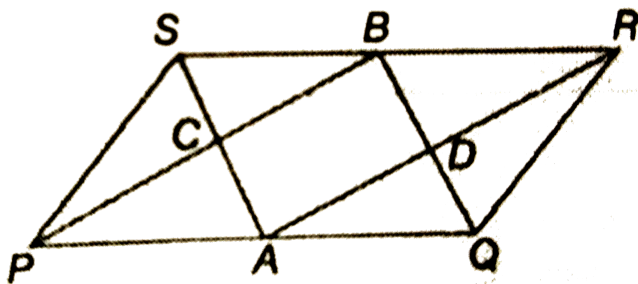
D. 15 cm

Answer: C



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50. In the given figure, PQRS is a parallelogram. A and B are the mid-point of \overline{PQ} and \overline{SR} respectively. If $PS=BR$, then the quadrilateral ADBC is a..... ,



- A. rhombus
- B. trapezium
- C. square
- D. rectangle

Answer: D



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51. The sides of a triangle are 2006 cm, 6002 cm and m cm, where m is a positive integer. Find the number of such possible triangles.

- A. 1
- B. 2006
- C. 3996
- D. 4011

Answer: D



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52. If a, b and c are the lengths of the sides of a right triangle ABC with $c = 2a$ and $b^2 - 3a^2 = 0$, then $\angle ABC = \dots\dots\dots$

A. 60°

B. 30°

C. 45°

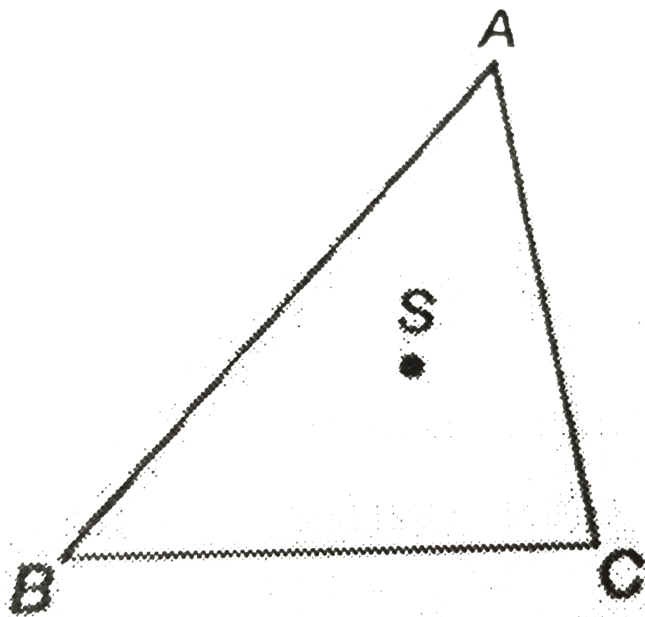
D. 90°

Answer: A



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53. In $\triangle ABC$, $AC = BC$, S is the circum-center and $\angle ASB = 150^\circ$. Find $\angle CAB$.



A. $55\left(\frac{1}{2}^\circ\right)$

B. $52\left(\frac{1}{2}^\circ\right)$

C. $90\left(\frac{1}{2}^\circ\right)$

D. $35\left(\frac{1}{2}\right)^\circ$

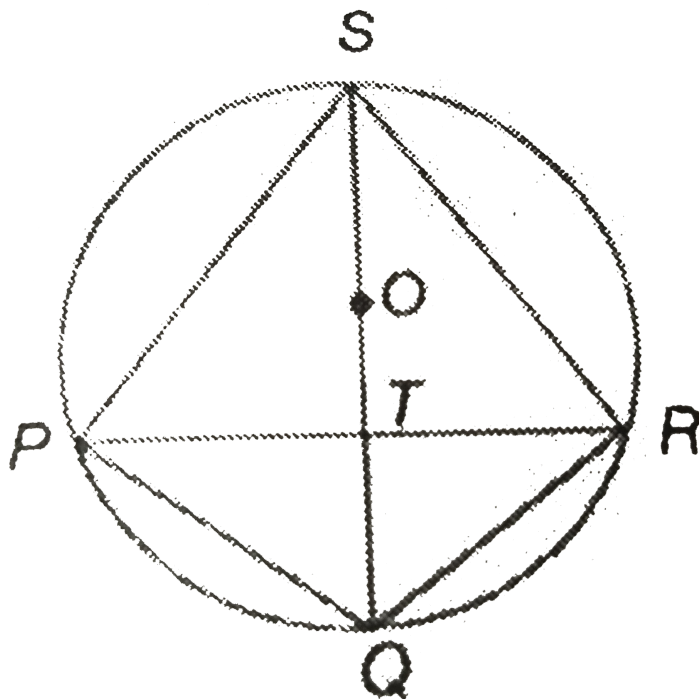
Answer: B



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54. In the given figure, P, Q, R and S are concyclic points, and O is the mid-point of the diameter QS . If

$\angle QPR = 25^\circ$, then find $\angle SQR$.



A. 130°

B. 120°

C. 75°

D. 100°

Answer: A



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55. In $\triangle ABC$, $\angle B = 90^\circ$, P, Q and R are the mid-points of \overline{AB} , \overline{BC} and \overline{AC} respectively. Then which of the following is true?

- A. A, P, Q and R are concyclic points.
- B. B, P, R and Q are concyclic points.
- C. C, Q, P and R are concyclic points.
- D. All of these

Answer: B



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56. If p , q and r are the lengths of the sides of a right triangle, PQR , and the hypotenuse $r = \sqrt{2pq}$, then $\angle QPR = \dots\dots\dots$

A. 50°

B. 45°

C. 60°

D. 30°

Answer: B



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57. In a triangle PQR , $PQ=QR$, A and B are the mid-points of \overline{QR} and \overline{PR} respectively. A circle passes through P, Q, A and B . Then which of the following is necessarily true?

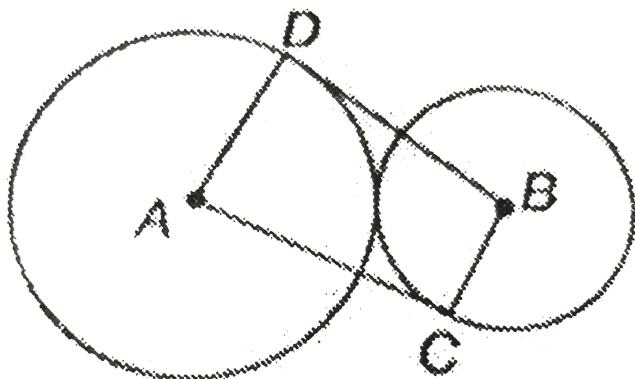
- A. \triangle is equilateral
- B. \triangle is right isosceles
- C. PQ is a diameter
- D. Both a) and c)

Answer: D



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58. In the figure given below (not to scale), D is a point on the circle with center A and C is a point on the circle with centers B, $\overline{AD} \perp \overline{BD}$ and $\overline{BC} \perp \overline{CA}$. Then which of the following is true?



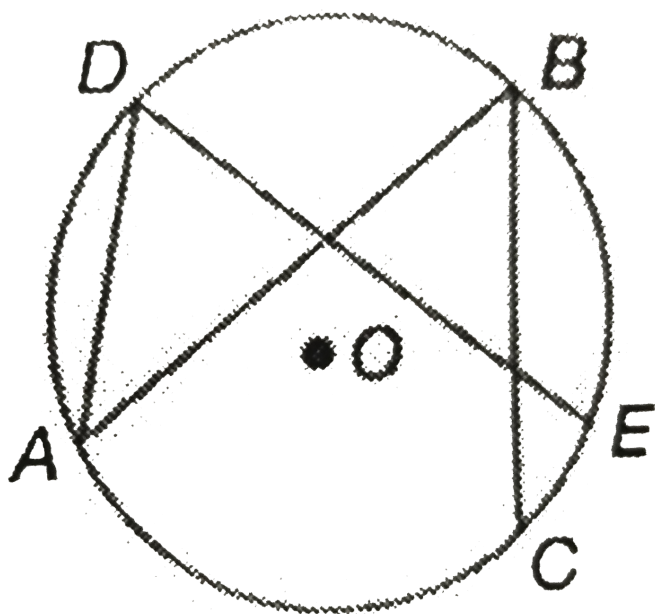
- A. $AD=BC$, when $AC=BD$
- B. $BD=AC$, when $\overline{AD} \parallel \overline{BC}$
- C. Both a) and b)
- D. $BD = AC$ is always true.

Answer: C



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59. In the given figure, the angles $\angle ADE$ and $\angle ABC$ differ by 15° . Find $\angle CAE$.



A. 10°

B. $7\left(\frac{1}{2}\right)^\circ$

C. 15°

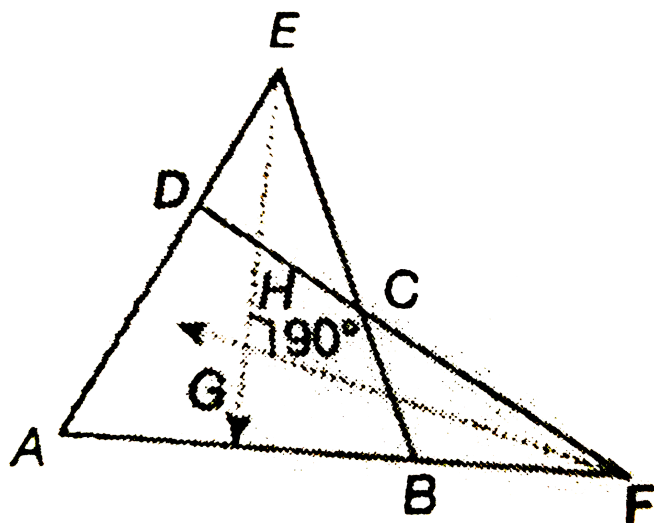
D. 30°

Answer: C



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60. In the given figure, ABCD is a cyclic quadrilateral, $\angle ABC = 70^\circ$, \overline{FG} bisects $\angle CFA$, \overline{EG} bisects $\angle DEB$, $\angle DCE = 60^\circ$ and $\angle EGF = 90^\circ$. Find

$\angle HEC.$ 

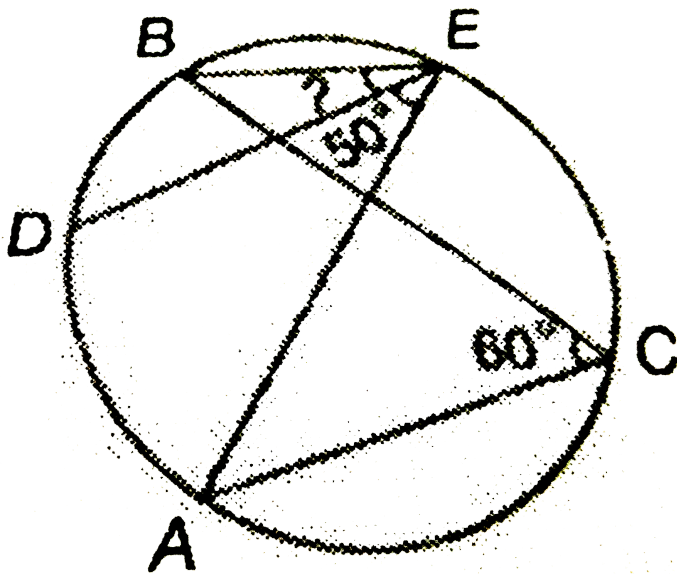
- A. 20°
- B. 40°
- C. 25°
- D. 45°

Answer: C

61. In the given figure, A, D, B, E and C are concyclic.

If $\angle ACB = 60^\circ$ and $\angle AED = 50^\circ$, then find $\angle DEB$

.



A. 15°

B. 10°

C. 20°

D. 5°

Answer: B



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