PRACTICE SHEET-1

1. The sides of a triangle are in the ratio 3 : 4 : 6. The triangle is:
(1) acute-angled
(2) right-angled
(3) obtuse-angled
(4) either acute-angled or right angled

2. Taking any three of the line segments out of segments of length 2 cm, 3 cm, 5 cm and 6 cm, the number of triangles that can be formed is:
(1) 3 (2) 2
(3) 1 (4) 4

3. If two angles of a triangle are 21° and 38°, then the triangle is
(1) Right-angled triangle
(2) Acute-angled triangle
(3) Obtuse-angled triangle
(4) Isosceles triangle

4. A man goes 24 m due west and then 10 m due north. Then the distance of him from the starting point is
(1) 17 m (2) 26 m
(3) 28 m (4) 34 m

5. If in ΔABC, $\angle ABC = 5\angle ACB$ and $\angle BAC = 3\angle ACB$, then $\angle ABC$ = ?
(1) 130° (2) 80°
(3) 100° (4) 120°

6. AD is the median of a triangle ABC and O is the centroid such that AO = 10 cm. The length of OD (in cm) is
(1) 4 (2) 5
(3) 6 (4) 8

7. The measure of the angle between the internal and external bisectors of an angle is
(1) 60° (2) 70°
(3) 80° (4) 90°

8. If the sides of a triangle are extended in both the sides then the sum of the exterior angles so formed in both sides is
(1) 360° (2) 540°
(3) 720° (4) 180°

9. The measures of two angles of a triangle are in the ratio 4 : 5. If the sum of these two measures is equal to the measure of the third angle, find the smallest angle.
(1) 10° (2) 50°
(3) 90° (4) 40°

10. The sides of a triangle are in the ratio of 7 : 9 : 12. The difference between the lengths of largest and smallest sides is 15 cm. The length of the largest side would be :
(1) 36 cm (2) 12 cm
(3) 60 cm (4) 24 cm

11. The side BC of a triangle ABC is produced to D. If $\angle ACD = 112°$ and $\angle B = (3/4)\angle A$, then the measure of $\angle B$ is
(1) 30° (2) 48°
(3) 45° (4) 64°

12. In a triangle ABC, if $\angle A + \angle C = 140°$ and $\angle A + 3\angle B = 180°$, then $\angle A$ is equal to
(1) 80° (2) 40°
(3) 60° (4) 20°

13. Which of the set of three sides can't form a triangle?
(1) 5 cm, 6 cm, 7 cm
(2) 5 cm, 8 cm, 15 cm
(3) 8 cm, 15 cm, 18 cm
(4) 6 cm, 7 cm, 11 cm

14. Possible measures of three angles of a triangle are
(1) 33°, 42°, 115° (2) 40°, 70°, 80°
(3) 30°, 60°, 100° (4) 50°, 60°, 70°

15. Suppose that the medians BD, CE and AF of a triangle ABC meet at G. Then AG : GF is
(1) 1 : 2 (2) 2 : 1
(3) 1 : 3 (4) 2 : 3

16. In case of an acute angled triangle, its orthocenter lies
(1) inside the triangle
(2) outside the triangle
(3) on the triangle
(4) on one of the vertices of the triangle

17. The centroid of a triangle is the point where
(1)the medians meet
(2)the altitudes meet
(3)the right bisectors of the sides of the triangle meet
(4)the bisectors of the angles of the triangle meet

18. An exterior angle of a triangle is 115° and one of the interior opposite angles is 45°. Then the other two angles are
(1) 65°, 70° (2) 60°, 75°
(3) 45°, 90° (4) 50°, 85°

19. If the difference between the measures of the two smaller angles of a right angled triangle is 8°, then the smallest angle is :
(1) 37° (2) 41°
(3) 42° (4) 49°

20. Three sides of a triangle are 5 cm, 9 cm and x cm. The minimum integral value of x is:
(1) 2 (2) 3
(3) 4 (4) 5

21. If the measures of the angles of a triangle are in the ratio. 1 : 2 : 3 and if the length of the smallest side of the triangle is 10 cm, then the length of the longest side is
(1) 20 cm. (2) 25 cm.
(3) 30 cm. (4) 35 cm.

22. The sum of two angles of a triangle is 116° and their difference is 24°. The measure of the smallest angle of the triangle is :
(1) 38° (2) 28°
(3) 46° (4) 64°

23. In a triangle, the distance of the centroid from the three vertices is 4 cm, 6 cm and 8 cm respectively. Then the length of the smallest median is:
(1) 8 (2) 7
(3) 6 (4) 5

24. If the complement of an angle is one–fourth of its supplementary angle, then the angle is
(1) 60° (2) 30°
(3) 90° (4) 120°

25. If two supplementary angles differ by 44°, then one of the angles is
(1) 68° (2) 65°
(3) 102° (4) 72°

26. The measure of an angle whose supplement is three times as large as its complement, is
(1) 75° (2) 30°
(3) 45° (4) 60°

27. In a triangle ABC, BC is produced to D so that CD = AC. If ∠BAD = 111° and ∠ACB = 80°, then the measure of ∠ABC is:
(1) 31° (2) 33°
(3) 35° (4) 29°

28. In ΔABC, ∠A + ∠B = 145° and ∠C + 2∠B = 180°. State which one of the following relations is true?
(1) CA = AB (2) CA < AB
(3) BC < AB (4) CA > AB

29. ∠A, ∠B, ∠C are three angles of a triangle. If ∠A – ∠B = 15°, ∠B – ∠C = 30°, then ∠A, ∠B and ∠C are
(1) 80°, 60°, 40° (2) 70°, 50°, 60°
(3) 80°, 65°, 35° (4) 80°, 55°, 45°

30. In a ΔABC ∠A : ∠B : ∠C = 2 : 3 : 4. A line CD drawn || to AB, then the ∠ACD is
(1) 40° (2) 60°
(3) 80° (4) 20°

ANSWER KEY																			
1.	(3)	2.	(2)	3.	(3)	4.	(2)	5.	(3)	6.	(2)	7.	(4)	8.	(3)	9.	(4)	10.	(1)
11.	(2)	12.	(3)	13.	(2)	14.	(4)	15.	(2)	16.	(1)	17.	(1)	18.	(1)	19.	(2)	20.	(4)
21.	(1)	22.	(3)	23.	(3)	24.	(1)	25.	(1)	26.	(3)	27.	(4)	28.	(4)	29.	(3)	30.	(1)

PRACTICE SHEET-2

1. O and C are respectively the ortho-centre and circum-centre of an acute-angled triangle PQR. The points P and O are joined and produced to meet the side QR at S. If ∠PQS = 60° and ∠QCR = 130°, then ∠RPS =
(1) 30° (2) 35°
(3) 100° (4) 60°

2. In ΔABC, AD is the internal bisector of ∠A, meeting the side BC at D. If BD = 5 cm, BC = 7.5 cm, then AB : AC is
(1) 2 : 1 (2) 1 : 2
(3) 4 : 5 (4) 3 : 5

3. If the circum-centre of a triangle lies outside it, then the triangle is
(1) Equilateral (2) Acute angled
(3) Right angled (4) Obtuse angled

4. If the length of the sides of a triangle are in the ratio 4 : 5 : 6 and the in radius of the triangle is 3 cm, then the altitude of the triangle corresponding to the largest side as base is :
(1) 7.5 cm (2) 6 cm
(3) 10 cm (4) 8 cm

5. ABC is a triangle. The bisectors of the internal angle ∠B and external angle ∠C intersect at D. If ∠BDC= 50°, then ∠A is
(1) 100° (2) 90°
(3) 120° (4) 60°

6. In a triangle ABC, the side BC is extended up to D. Such that CD = AC, if ∠BAD = 109° and ∠ACB = 72° then the value of ∠ABC is
(1) 35° (2) 60°
(3) 40° (4) 45°

7. The sum of three altitudes of a triangle is
(1) equal to the sum of three sides
(2) less than the sum of sides
(3) greater than the sum of sides
(4) twice the sum of sides

8. I is the incentre of ΔABC, ∠ABC = 60° and ∠ACB = 50°. Then ∠BIC is:
(1) 55° (2) 125°
(3) 70° (4) 65°

9. In ΔABC, ∠C is an obtuse angle. The bisectors of the exterior angles at A and B meet BC and AC produced at D and E respectively. If AB = AD = BE, then ∠ACB
(1) 105° (2) 108°
(3) 110° (4) 135°

10. The exterior angles obtained on producing the base BC of a triangle ABC in both ways are 120° and 105°, then the vertical ∠A of the triangle is of measure
(1) 36° (2) 40°
(3) 45° (4) 55°

11. O is the in centre of ΔABC and ∠A = 30°, then ∠BOC is
(1) 100° (2) 105°
(3) 110° (4) 90°

12. Let O be the in-centre of a triangle ABC and D be a point on the side BC of ΔABC, such that $OD \perp BC$. If $\angle BOD = 15°$, then $\angle ABC =$
(1) 75° (2) 45°
(3) 150° (4) 90°

13. The external bisector of ∠B and ∠C of ΔABC (where AB and AC extended to E and F respectively) meet at point P. If ∠BAC = 100°, then the measure of ∠BPC is
(1) 50° (2) 80°
(3) 40° (4) 100°

14. The points D and E are taken on the sides AB and AC of ΔABC such that AD = (1/3) AB, AE =(1/3) AC. If the length of BC is 15 cm, then the length of DE is :
(1) 10 cm (2) 8 cm
(3) 6 cm (4) 5 cm

15. In a triangle ABC, AB + BC = 12 cm, BC + CA = 14 cm and CA + AB = 18 cm. Find the radius of the circle (in cm) which has the same perimeter as the triangle.
(1) 5/2 (2) 7/2
(3) 9/2 (4) 11/2

16. In ΔABC, D is the mid-point of BC. Length AD is 27 cm. N is a point in AD such that the length of DN is 12 cm. The distance of N from the centroid of ΔABC is equal to
(1) 3 cm (2) 6 cm
(3) 9 cm (4) 15 cm

17. In ΔABC, B = 60°, ∠C = 40°, AD is the bisector of ∠A and AE is drawn

perpendicular on BC from A. Then the measure of ∠EAD is
(1) 40° (2) 30°
(3) 10° (4) 80°

18. O is the orthocentre of ΔABC. Then ∠BOC + ∠BAC is equal to
(1) 120° (2) 135°
(3) 180° (4) 90°

19. ABC is a triangle and the sides AB, BC and CA are produced to E, F and G respectively. If ∠CBE = ∠ACF = 130° then the value of ∠GAB is
(1) 100° (2) 130°
(3) 80° (4) 90°

20. G is the centroid of ΔABC. The medians AD and BE intersect at right angles. If the lengths of AD and BE are 9 cm and 12 cm respectively; then the length of AB (in cm) is
(1) 9.5 (2) 10
(3) 11 (4) 10.5

21. The internal bisectors of the ∠B and ∠C of the ΔABC, intersect at O. If ∠A = 100°, then the measure of ∠BOC is:
(1) 140° (2) 120°
(3) 110° (4) 130°

22. AD is perpendicular to the internal bisector of ∠ABC of ΔABC. DE is drawn through D and parallel to BC to meet AC at E. If the length of AC is 12 cm, then the length of AE (in cm.) is
(1) 3 (2) 8
(3) 4 (4) 6

23. What is the position of the circum-centre of an obtuse–angled triangle?
(1) It lies inside the triangle.
(2) It lies outside the triangle.
(3) It is the mid–point of the largest side.
(4) It is the vertex opposite to the largest side.

24. E is the mid-point of the median AD of ΔABC. BE is joined and produced to meet AC at F. F divides AC in the ratio:
(1) 2 : 3 (2) 2 : 1
(3) 1 : 3 (4) 3 : 2

25. G is the centroid of ΔABC. If AG = BC, then measure of ∠BGC is
(1) 45° (2) 60°
(3) 90° (4) 120°

26. B_1 is a point on the side AC of ΔABC and B_1B is joined. A line is drawn through A parallel to B_1B meeting BC at A_1 and another line is drawn through C parallel to B_1B meeting AB produced at C_1 .Then
(1) $\frac{1}{CC_1}-\frac{1}{AA_1}=\frac{1}{BB_1}$
(2) $\frac{1}{CC_1}+\frac{1}{AA_1}=\frac{1}{BB_1}$
(3) $\frac{1}{BB_1}-\frac{1}{AA_1}=\frac{2}{CC_1}$
(4) $\frac{1}{AA_1}-\frac{1}{CC_1}=\frac{2}{BB_1}$

27. In ΔPQR, straight line parallel to the base QR cuts PQ at X and PR at Y. If PX : XQ = 5 : 6, then XY : QR will be
(1) 5 : 11 (2) 6 : 5
(3) 11 : 6 (4) 11 : 5

28. In a triangle the length of the side opposite the angle which measures 45° is 8 cm, what is the length of the side opposite to the angle which measures 90°?
(1) 8 √2 cm. (2) 4 √2 cm.
(3) 8 √3 cm. (4) 4 √3 cm.

29. In a triangle ABC, ∠A = 70°, ∠B = 80° and D is the in centre of ΔABC. ∠ACB = $2x$° and ∠BDC = y°. The values of x and y, respectively are
(1) 15, 130 (2) 15, 125
(3) 35, 40 (4) 30, 150

30. If O is the ortho-centre of a triangle ABC and ∠BOC = 100°, the measure of ∠BAC is
(1) 100° (2) 180°
(3) 80° (4) 200°

ANSWER KEY

1.	(2)	2.	(1)	3.	(4)	4.	(1)	5.	(1)	6.	(1)	7.	(2)	8.	(2)	9.	(2)	10.	(3)
11.	(2)	12.	(3)	13.	(3)	14.	(4)	15.	(2)	16.	(1)	17.	(3)	18.	(3)	19.	(1)	20.	(2)
21.	(1)	22.	(4)	23.	(2)	24.	(2)	25.	(3)	26.	(2)	27.	(1)	28.	(1)	29.	(2)	30.	(3)

PRACTICE SHEET-3

1. If the in-centre of an equilateral triangle lies inside the triangle and its radius is 3 cm, then the side of the equilateral triangle is
(1) 9 √3 cm (2) 6 √3 cm
(3) 3 √3 cm (4) 6 cm

2. ABC is an equilateral triangle and CD is the internal bisector of ∠C. If DC is produced to E such that AC = CE, then ∠CAE is equal to
(1) 45° (2) 75°
(3) 30° (4) 15°

3. G is the centroid of the equilateral ΔABC. If AB = 10 cm then length of AG is
(1) 5√3/3 cm (2) 10√3/3 cm
(3) 5√3 cm (4) 10√3 cm

4. The side BC of a triangle ABC is extended to D. If ∠ACD = 120° and ∠ABC = (1/2) ∠ CAB, then the value of ∠ABC is
(1) 80° (2) 40°
(3) 60° (4) 20°

5. If the three angles of a triangle are : $(x + 15°)$,$(6x/5 + 6°)$,and $(2x/3 + 30°)$, then the triangle is :
(1) Isosceles (2) Right angled
(3) Equilateral (d) None of these

6. Let ABC be an equilateral triangle and AD perpendicular to BC. Then $AB^2 + BC^2 + CA^2$ = ?
(1) $2AD^2$ (2) $3AD^2$
(3) $4AD^2$ (4) $5AD^2$

7. O is the ortho-centre of ΔABC, and if ∠BOC = 110°, then ∠BAC will be
(1) 110° (2) 70°
(3) 100° (4) 90°

8. ABC is an equilateral triangle. Points D, E, F are taken in sides AB, BC, CA respectively, so that AD = BE = CF. Then AE, BF, CD enclosed a triangle which is:
(1) equilateral triangle
(2) isosceles triangle
(3) right angle triangle
(4) None of these

9. The lengths of the sides of a triangle are a, b and c respectively. If $a^2 + b^2 + c^2 = ab + bc + ca$, then the triangle is:
(1) Isosceles (2) Equilateral
(3) Scalene (4) Right-angled

10. PQR is an equilateral triangle. MN is drawn parallel to QR such that M is on PQ and N is on PR. If PN = 6 cm, then the length of MN is
(1) 3 cm (2) 6 cm
(3) 12 cm (4) 4.5 cm

11. Two medians AD and BE of ΔABC intersect at G at right angles. If AD = 9 cm and BE = 6 cm, then the length of BD (in cm) is
(1) 10 (2) 6
(3) 5 (4) 3

12. In ΔABC, $\angle BAC = 90°$ and AB=(1/2)BC . Then the measure of ∠ACB is:
(1) 60° (2) 30°
(3) 45° (4) 15°

13. If the length of the three sides of a triangle are 6 cm, 8 cm and 10 cm, then the length of the median to its greatest side is
(1) 8 cm (2) 6 cm
(3) 5 cm (4) 4.8 cm

14. The length of the three sides of a right angled triangle are $(x – 2)$ cm, x cm and $(x + 2)$ cm respectively. Then the value of x is
(1) 10 (2) 8
(3) 4 (4) 0

15. In a triangle ABC, ∠BAC = 90° and AD is perpendicular to BC. If AD = 6 cm and BD = 4 cm, then the length of BC is
(1) 8 cm (2) 10 cm
(3) 9 cm (4) 13 cm

16. In a right angled ΔABC, ∠ABC = 90°; BN is perpendicular to AC, AB = 6 cm, AC = 10 cm. Then AN : NC is
(1) 3 : 4 (2) 9 :16
(3) 3 : 16 (4) 1 : 4

17. In ΔABC, ∠A = 90° and AD ⊥ BC where D lies on BC. If BC = 8 cm, AC = 6 cm, then ΔABC : ΔACD =?
(1) 4 : 3 (2) 25 : 16
(3) 16 : 9 (4) 25 : 9

18. In a right-angled triangle ABC, ∠ABC = 90°, AB = 5 cm and BC = 12 cm. The radius of the circum-circle of the triangle ABC is
(1) 7.5 cm (2) 6 cm
(3) 6.5 cm (4) 7 cm

19. In a right-angled triangle, the product of two sides is equal to half of the square of the third side i.e., hypotenuse. One of the acute angle must be
(1) 60° (2) 30°
(3) 45° (4) 15°

20. D and E are two points on the sides AC and BC respectively of ΔABC such that DE = 18 cm, CE = 5 cm and ∠DEC = 90°. If tan ∠ABC = 3.6, then AC : CD =
(1) BC : 2 CE (2) 2 CE : BC
(3) 2 BC : CE (4) CE : 2 BC

21. If ΔABC is an isosceles triangle with ∠C = 90° and AC = 5 cm, then AB is:
(1) 5 cm (2) 10 cm
(3) $5\sqrt{2}$ cm (4) 2.5 cm

22. ABC is an isosceles triangle such that AB = AC and ∠B = 35°. AD is the median to the base BC. Then ∠BAD is:
(1) 70° (2) 35°
(3) 110° (4) 55°

23. ABC is an isosceles triangle with AB = AC. A circle through B touching AC at the middle point intersects AB at P. Then AP : AB is :
(1) 4 : 1 (2) 2 : 3
(3) 3 : 5 (4) 1 : 4

24. In an isosceles triangle, if the unequal angle is twice the sum of the equal angles, then each equal angle is
(1) 120° (2) 60°
(3) 30° (4) 90°

25. ΔABC is an isosceles triangle and AB = AC = $2a$ unit, BC = a unit. Draw AD ⊥ BC , and find the length of AD .
(1) 15 a unit (2) $\sqrt{15}/2$ a unit
(3) 17 a unit (4) $17/2$ a unit

26. ABC is an isosceles triangle inscribed in a circle. If AB = AC = $12\sqrt{5}$ cm and BC = 24 cm then the radius of circle is
(1) 10 cm. (2) 15 cm.
(3) 12 cm. (4) 14 cm.

27. The vertical angle A of an isosceles triangle ΔABC is three times the angle B of it. The measure of the angle A is
(1) 90° (2) 108°
(3) 100° (4) 36°

28. ΔABC is isosceles having AB = AC and ∠A = 40°. Bisectors PO and OQ of the exterior angles ABD and ∠ACE formed by producing BC on both sides, meet at O. Then the value of ∠BOC is
(1) 70° (2) 110°
(3) 80° (4) 55°

29. ΔABC is an isosceles triangle with AB = AC = 15 cm and altitude from A to BC is 12 cm. The length of side BC is:
(1) 9 cm. (2) 12 cm.
(3) 18 cm. (4) 20 cm.

30. In an isosceles ΔABC, AD is the median to the unequal side meeting BC at D. DP is the angle bisector of ∠ADB and PQ is drawn parallel to BC meeting AC at Q. Then the measure of ∠PDQ is:
(1) 130° (2) 90°
(3) 180° (4) 45°

ANSWER KEY

1.	(2)	2.	(4)	3.	(2)	4.	(2)	5.	(3)	6.	(3)	7.	(2)	8.	(1)	9.	(2)	10.	(2)
11.	(3)	12.	(2)	13.	(3)	14.	(2)	15.	(4)	16.	(2)	17.	(3)	18.	(3)	19.	(3)	20.	(1)
21.	(3)	22.	(4)	23.	(4)	24.	(3)	25.	(2)	26.	(2)	27.	(2)	28.	(1)	29.	(3)	30.	(2)

PRACTICE SHEET-4

1. In ΔABC and ΔDEF, AB = DE and BC = EF. Then one can infer that ΔABC ≅ ΔDEF, when
(1) ∠BAC = ∠EDF (2) ∠ACB = ∠EDF
(3) ∠ACB = ∠DFE (4) ∠ABC = ∠DEF

2. In ΔPQR, S and T are points on sides PR and PQ respectively such that ∠PQR =∠PST. If PT = 5 cm, PS = 3 cm and TQ = 3 cm, then length of SR is
(1) 5 cm (2) 6 cm
(3) 31/3 cm (4) 41/3 cm

3. The perimeters of two similar triangles ΔABC and ΔPQR are 36 cm and 24 cm respectively. If PQ = 10 cm, then AB is
(1) 15 cm (2) 12 cm
(3) 14 cm (4) 26 cm

4. In ΔABC, two points D and E are taken on the lines AB and BC respectively in such a way that AC is parallel to DE. Then ΔABC and ΔDBE are
(1)similar only if D lies outside the line segment AB
(2)congruent only if D lies outside the line segment AB
(3)always similar
(4)always congruent

5. Inside a triangle ABC, a straight line parallel to BC intersects AB and AC at the point P and Q respectively. If AB = 3 PB, then PQ : BC is
(1) 1 : 3 (2) 3 : 4
(3) 1 : 2 (4) 2 : 3

6. In ΔABC, D and E are points on AB and AC respectively such that DE || BC and DE divides the ΔABC into two parts of equal areas. Then ratio of AD and BD is
(1) 1 : 1 (2) 1 : √2 -1
(3) 1 : √2 (4) 1 : √2 +1

7. In ΔABC, DE || AC. D and E are two points on AB and CB respectively. If AB = 10 cm and AD = 4 cm, then BE : CE is
(1) 2 : 3 (2) 2 : 5
(3) 5 : 2 (4) 3 : 2

8. For a triangle ABCD and E are two points on AB and AC such that AD = (1/4) AB, AE = (1/4) AC. If BC = 12 cm, then DE is
(1) 5 cm (2) 4 cm
(3) 3 cm (4) 6 cm

9. In triangle ABC a straight line parallel to BC intersects AB and AC at D and E respectively. If AB = 2AD then DE : BC is
(1) 2 : 3 (2) 2 : 1
(3) 1 : 2 (4) 1 : 3

10. In a ΔABC, D and E are two points on AB and AC respectively such that DE || BC, DE bisects the ΔABC in two equal areas. Then the ratio DB : AB is
(1) 1 : √2 (2) 1 : 2
(3) (√2 – 1) : √2 (4) √2 : 1

11. In ΔABC, E and D are points on sides AB and AC respectively such that ∠ABC = ∠ADE. If AE = 3 cm, AD = 2 cm and EB = 2 cm, then length of DC is
(1) 4 cm (2) 4.5 cm
(3) 5.0 cm (4) 5.5 cm

12. D ABC and D DEF are similar. Also ∠A = ∠D and ∠B = ∠E. If 4AB = DE and BC = 12 cm, then EF is equal to
(1) 3 cm (2) 24 cm
(3) 16 cm (4) 48 cm

13. In ΔABC the straight line parallel to the side BC meets AB and AC at the points P and Q respectively. If AP = QC, the length of AB is 12 units and the length of AQ is 2 units, then the length (in units) of CQ is
(1) 4 (2) 6
(3) 8 (4) 10

14. ABC is a triangle in which DE || BC and AD : DB = 5 : 4. Then DE : BC is
(1) 4 : 5 (2) 4 : 9
(3) 9 : 5 (4) 5 : 9

15. If in a triangle ABC, BE and CF are two medians perpendicular to each other and if AB = 19cm and AC = 22 cm then the length of BC is
(1) 19.5 cm (2) 26 cm
(3) 20.5 cm (4) 13 cm

16. The medians CD and BE of a triangle ABC interest each other at O. The ratio ΔODE : ΔABC is equal to
(1) 12 : 1 (2) 4 : 3
(3) 3 : 4 (4) 1 : 12

17. ΔABC and ΔDEF are two similar triangles and the perimeters of ΔABC and ΔDEF are 30 cm and 18 cm respectively. If the length of DE = 36 cm, then length of AB is
(1) 60 cm. (2) 40 cm.
(3) 45 cm. (4) 50 cm.

18. If ΔPQR and ΔLMN are similar and 3PQ = LM and MN = 9 cm, then QR is equal to:
(1) 12 cm (2) 6 cm
(3) 9 cm (4) 3 cm

19. The perimeter of two similar triangles ABC and PQR are 36 cms and 24 cms respectively. If PQ = 10 cm then the length of AB is
(1) 18 cm (2) 12 cm
(3) 15 cm (4) 30 cm

20. Which of the following is a true statement?
(1)Two similar triangles are always congruent.
(2)Two similar triangles have equal areas
(3)Two triangles are similar if their corresponding sides are proportional.
(4)Two polygons are similar if their corresponding sides are proportional.

21. The perimeter of two similar triangles ΔABC and ΔPQR are 60 cm and 36 cm respectively. If PQ = 18 cm, then AB is :
(1) 20 cm (2) 24 cm
(3) 36 cm (4) 30 cm

22. D and E are the points on the sides AB and AC respectively of a ΔABC and AD = 8 cm , DB = 12 cm, AE = 6cm and EC = 9cm , then BC is equal to
(1) $\frac{2}{5}DE$ (2) $\frac{5}{2}DE$
(3) $\frac{3}{2}DE$ (4) $\frac{2}{3}DE$

23. A vertical stick 15cm long casts a shadow 12m long on the ground. At the same time, a tower casts a shadow 50m long on the ground. The height of the tower is
(1) 60m (2) 62m
(3) 62.5m (4) 63m

24. The areas of two similar triangles are 81 cm^2 and 49 cm^2 respectively,. The ratio of their corresponding heights is
(1) 9:7 (2) 7 :9
(3) 6:5 (4) 81:49

25. If D and E are points on the sides AB and AC respectively of a ΔABC such that DE||BC . If AD = x, DB = x - 2, AE = x + 2 and EC = x - 1 . The value of x is
(1) 2.5 (2) 2
(3) 3 (4) 4

26. In a ΔABC, AE is bisector of exterior ∠CAD meeting BC produced in E. If AB = 10cm, AC = 6cm, BC = 12cm, then CE is equal to
(1) 20 cm (2) 14 cm
(3) 16 cm (4) 18 cm

27. In ΔPQR, ∠Q = 3a, ∠P = a, ∠R = b and 3b − 5a = 30, then triangle is
(1) Scalene (2) Isosceles
(3) Equilateral (4) Right angled

28. The points D and E are taken on the sides AB and AC of ΔABC such that AD = (1/3) AB, AE = (1/3) AC. If the length of BC is 15 cm, then the length of DE is:
(1) 10 cm (2) 8 cm
(3) 6 cm (4) 5 cm

29. *D* is any point on side *AC* of Δ*ABC*. If *P, Q, X, Y* are the midpoints of *AB, BC, AD* and *DC* respectively, then the ratio of *PX* and *QY* is
(1) 1 : 2 (2) 1 : 1
(3) 2 : 1 (4) 2 : 3

30. In ΔABC, PQ is parallel to BC. If AP : PB = 1 : 2 and AQ = 3 cm; AC is equal to
(1) 6 cm (2) 9 cm
(3) 12 cm (4) 8 cm

ANSWER KEY																			
1.	(4)	2.	(3)	3.	(1)	4.	(3)	5.	(4)	6.	(2)	7.	(4)	8.	(3)	9.	(3)	10.	(3)
11.	(4)	12.	(4)	13.	(1)	14.	(4)	15.	(4)	16.	(4)	17.	(1)	18.	(4)	19.	(3)	20.	(3)
21.	(4)	22.	(2)	23.	(3)	24.	(1)	25.	(4)	26.	(4)	27.	(4)	28.	(4)	29.	(2)	30.	(2)

PRACTICE SHEET-5

1. Q is a point in the interior of a rectangle ABCD. If QA = 3 cm, QB = 4 cm and QC = 5 cm, then the length of QD (in cm) is
(1) 3 √2 (2) 5 √2
(3) √34 (4) √41

2. ABCD is a rectangle where the ratio of the length of AB and BC is 3 : 2. If P is the mid-point of AB, then the value of sin ∠CPB is
(1) 3/5 (2) 2/5
(3) 1/5 (4) 4/5

3. If the opposite sides of a quadrilateral and also its diagonals are equal, then each of the angles of the quadrilateral is
(1) 90° (2) 120°
(3) 100° (4) 60°

4. The length of the two adjacent sides of a rectangle inscribed in a circle are 5 cm and 12 cm respectively. Then the radius of the circle will be
(1) 6 cm (2) 6.5 cm
(3) 8 cm (4) 8.5 cm

5. PQRA is a rectangle, AP = 22 cm, PQ = 8 cm. ΔABC is a triangle whose vertices lie on the sides of PQRA such that BQ = 2 cm and QC = 16 cm. Then the length of the line joining the mid points of the sides AB and BC is
(1) 4 √2 cm. (2) 5 cm.
(3) 6 cm. (4) 10 cm.

6. Inside a square ABCD, D BEC is an equilateral triangle. If CE and BD intersect at O, then ∠BOC is equal to
(1) 60° (2) 75°
(3) 90° (4) 120°

7. A square is inscribed in a quarter- circle in such a manner that two of its adjacent vertices lie on the two radii at an equal distance from the centre, while the other two vertices lie on the circular arc. If the square has sides of length x, then the radius of the circle is
(1) $\sqrt{2}x$ (2) $16/(\pi+4)$
(3) $2x/\sqrt{\pi}$ (4) $\sqrt{5}x/\sqrt{2}$

8. Each interior angle of a regular polygon is three times its exterior angle, then the number of sides of the regular polygon is :
(1) 9 (2) 8
(3) 10 (4) 7

9. In a regular polygon, the exterior and interior angles are in the ratio 1 : 4. The number of sides of the polygon is
(1) 10 (2) 12
(3) 15 (4) 16

10. The difference between the exterior and interior angles at a vertex of a regular polygon is 150°. The number of sides of the polygon is
(1) 10 (2) 15
(3) 24 (4) 30

11. Each interior angle of a regular polygon is 144°. The number of sides of the polygon is
(1) 8 (2) 9
(3) 10 (4) 11

12. If the sum of the interior angles of a regular polygon be 1080°, the number of sides of the polygon is
(1) 6 (2) 8
(3) 10 (4) 12

13. The number of sides in two regular polygons are in the ratio 5 : 4 and the difference between each interior angle of the polygons is 6°. Then the numbers of sides are
(1) 15, 12 (2) 5, 4
(3) 10, 8 (4) 20, 16

14. Each internal angle of regular polygon is two times its external angle. Then the number of sides of the polygon is:
(1) 8 (2) 6
(3) 5 (4) 7

15. Ratio of the number of sides of two regular polygons is 5 : 6 and the ratio of their each interior angle is 24 : 25. Then the number of sides of these two polygons are:
(1) 20, 24 (2) 15, 18
(3) 10, 12 (4) 5, 6

16. Measure of each interior angle of a regular polygon can never be:
(1) 150° (2) 105°
(3) 108° (4) 144°

17. The sum of all interior angles of a regular polygon is twice the sum of all its exterior angles. The number of sides of the polygon is
(1) 10 (2) 8
(3) 12 (4) 6

18. The ratio between the number of sides of two regular polygons is 1 : 2 and the ratio between their interior angles is 2 : 3. The number of sides of these polygons is respectively
(1) 6, 12 (2) 5, 10
(3) 4, 8 (4) 7, 14

19. There are two regular polygons with number of sides equal to $(n - 1)$ and $(n + 2)$. Their exterior angles differ by 6°. The value of n is
(1) 14 (2) 12
(3) 13 (4) 11

20. If each interior angle of a regular polygon is 150°, the number of sides of the polygon is
(1) 8 (2) 10
(3) 15 (4) None of these

21. The sum of interior angles of a regular polygon is 1440°. The number of sides of the polygon is
(1) 10 (2) 12
(3) 6 (4) 8

22. Among the angles 30°, 36°, 45°, 50° one angle cannot be an exterior angle of a regular polygon. The angle is
(1) 30° (2) 36°
(3) 45° (4) 50°

23. If the sum of interior angles of a regular polygon is equal to two times the sum of exterior angles of that polygon, then the number of sides of that polygon is
(1) 5 (2) 6
(3) 7 (4) 8

24. An interior angle of a regular polygon is 5 times its exterior angle. Then the number of sides of the polygon is
(1) 14 (2) 16
(3) 12 (4) 18

25. The interior angle of a regular polygon is 140°. The number of sides of that polygon is
(1) 9 (2) 8
(3) 7 (4) 6

26. In a regular polygon if one of its internal angle is greater than the external angle by 132°, then the number of sides of the polygon is
(1) 14 (2) 12
(3) 15 (4) 16

27. If the ratio of an external angle and an internal angle of a regular polygon is 1 : 17, then the number of sides of the regular polygon is
(1) 20 (2) 18
(3) 36 (4) 12

28. The length of the diagonal BD of the parallelogram ABCD is 18 cm. If P and Q are the centroid of the ΔABC and ΔADC respectively then the length of the line segment PQ is
(1) 4 cm (2) 6 cm
(3) 9 cm (4) 12 cm

29. The side AB of a parallelogram ABCD is produced to E in such way that BE = AB. DE intersects BC at Q. The point Q divides BC in the ratio
(1) 1 : 2 (2) 1 : 1
(3) 2 : 3 (4) 2 : 1

30. In a parallelogram PQRS, angle P is four times of angle Q, then the measure of ∠R is
(1) 144° (2) 36°
(3) 72° (4) 130°

ANSWER KEY

1.	(1)	2.	(4)	3.	(1)	4.	(2)	5.	(2)	6.	(2)	7.	(4)	8.	(2)	9.	(1)	10.	(3)
11.	(3)	12.	(2)	13.	(1)	14.	(2)	15.	(3)	16.	(2)	17.	(4)	18.	(3)	19.	(3)	20.	(4)
21.	(1)	22.	(4)	23.	(2)	24.	(3)	25.	(1)	26.	(3)	27.	(3)	28.	(2)	29.	(2)	30.	(1)

PRACTICE SHEET-6

1. Two equal circles of radius 4 cm intersect each other such that each passes through the centre of the other. The length of the common chord is :
(1) $2\sqrt{3}$ cm (2) $4\sqrt{3}$ cm
(3) $2\sqrt{2}$ cm (4) 8 cm

2. One chord of a circle is known to be 10.1 cm. The radius of this circle must be:
(1) 5 cm
(2) greater than 5 cm
(3) greater than or equal to 5 cm
(4) less than 5 cm

3. The length of the chord of a circle is 8 cm and perpendicular distance between centre and the chord is 3 cm. Then the radius of the circle is equal to:
(1) 4 cm (2) 5 cm
(3) 6 cm (4) 8 cm

4. The length of a chord of a circle is equal to the radius of the circle. The angle which this chord subtends in the major segment of the circle is equal to
(1) 30° (2) 45°
(3) 60° (4) 90°

5. AB = 8 cm and CD = 6 cm are two parallel chords on the same side of the centre of a circle. The distance between them is 1 cm. The radius of the circle is
(1) 5 cm (2) 4 cm
(3) 3 cm (4) 2 cm

6. The length of two chords AB and AC of a circle are 8 cm and 6 cm and $\angle BAC = 90°$, then the radius of circle is
(1) 25 cm (2) 20 cm
(3) 4 cm (4) 5 cm

7. The distance between two parallel chords of length 8 cm each in a circle of diameter 10 cm is
(1) 6 cm (2) 7 cm
(3) 8 cm (4) 5·5 cm

8. The length of the common chord of two intersecting circles is 24 cm. If the diameter of the circles are 30 cm and 26 cm, then the distance between the centre (in cm) is
(1) 13 (2) 14
(c) 15 (d) 16

9. In a circle of radius 21 cm, an arc subtends an angle of 72° at the centre. The length of the arc is
(1) 21.6 cm (2) 26.4 cm
(3) 13.2 cm (4) 19.8 cm

10. A unique circle can always be drawn through x number of given non-collinear points, then x must be:
(1) 2 (2) 3
(3) 4 (4) 5

11. A 8 cm long perpendicular is drawn from the centre of a circle to a 12 cm long chord. The diameter of the circle is:
(1) 10 cm. (2) 12 cm.
(3) 16 cm. (4) 20 cm.

12. The length of the radius of a circle with centre O is 5 cm and the length of the chord AB is 8 cm. The distance of the chord AB from the point O is
(1) 2 cm. (2) 3 cm.
(3) 4 cm. (4) 15 cm.

13. Two circles touch each other externally. The distance between their centres is 7 cm. If the radius of one circle is 4 cm, then the radius of the other circle will be
(1) 3 cm. (2) 4 cm.
(3) 5.5 cm. (4) 3.5 cm.

14. Points P, Q and R are on a circle such that $\angle PQR = 40°$ and $\angle QRP = 60°$. Then the subtended angle by arc QR at the centre is :
(1) 80° (2) 120°
(3) 140° (4) 160°

15. The length of a chord which is at a distance of 12 cm from the centre of a circle of radius 13 cm is
(1) 10 cm. (2) 5 cm.
(3) 6 cm. (4) 12 cm.

16. Number of circles that can be drawn through three non-collinear points is:
(1) Exactly one (2) Two
(3) Three (4) more than three

17. Two circles touch each other internally. The radius of the smaller circle is 6 cm and the distance between the centre of two circles is 3 cm. The radius of the larger circle is :
(1) 7.5 cm (2) 9 cm
(3) 8 cm (4) 10 cm

18. Length of a chord PQ of a circle with centre O is 4 cm. If the distance of PQ from the point O is 2 cm, then the length of the diameter is:
(1) 2 √2 cm. (2) 3 √2 cm.
(3) 5 √2 cm. (4) 4 √2 cm.

19. A chord of length 39 cm is at a distance of 10.4 cm from the centre of a circle. Find the radius of the circle.
(1) 19.5 cm. (appr.) (2) 22.1 cm.(appr.)
(3) 28.6 cm. (appr.) (4) 2. 21 cm. (appr.)

20. A chord of length 10 cm subtends an angle 120° at the centre of a circle. Distance of the chord from the centre is
(1) 5√3 cm. (2) 5√3/2 cm
(3) 5/√3 cm. (4) 5 cm.

21. The radius of two concentric circles are 9 cm and 15 cm. If the chord of the greater circle be a tangent to the smaller circle, then the length of that chord is
(1) 24 cm (2) 12 cm
(3) 30 cm (4) 18 cm

22. If a chord of a circle of radius 5 cm is a tangent to another circle of radius 3 cm, both the circles being concentric, then the length of the chord is
(1) 10 cm (2) 12.5 cm
(3) 8 cm (4) 7 cm

23. The tangents are drawn at the extremities of diameter *AB* of a circle with centre *P*. If a tangent to the circle at the point *C* intersects the other two tangents at *Q* and *R*, then the measure of the $\angle QPR$ is
(1) 45° (2) 60°
(3) 90° (4) 180°

24. *AB* is a chord to a circle and *PAT* is the tangent to the circle at *A*. If $\angle BAT = 75°$ and $\angle BAC = 45°$, *C* being a point on the circle, then $\angle ABC$ is equal to
(1) 40° (2) 45°
(3) 60° (4) 70°

25. The tangents at two points A and B on the circle with centre O intersects at P ; If in quadrilateral PAOB, ∠AOB: ∠APB = 5 : 1, then measure of ∠APB is :
(1) 30° (2) 60°
(3) 45° (4) 15°

26. Two circles touch each other externally at point A and PQ is a direct common tangent which touches the circles at P and Q respectively. Then ∠PAQ =
(1) 45° (2) 90°
(3) 80° (4) 100°

27. PR is tangent to a circle, with centre O and radius 4 cm, at point Q. If ∠POR = 90°, OR = 5 cm and OP = 20/ 3 cm, then (in cm) the length of PR is :
(1) 3 (2) 16/3
(3) 23/3 (4) 25/3

28. Two circles touch each other externally at P. AB is a direct common tangent to the two circles, A and B are point of contact and ∠PAB = 35°. Then ∠ABP is
(1) 35° (2) 55°
(3) 65° (4) 75°

29. If the radii of two circles be 6 cm and 3 cm and the length of the transverse common tangent be 8 cm, then the distance between the two centres is
(1) √145 cm (2) √140 cm
(3) √150 cm (4) √135 cm

30. The distance between the centre of two equal circles, each of radius 3 cm, is 10 cm. The length of a transverse common tangent is
(1) 8 cm (2) 10 cm
(3) 4 cm (4) 6 cm

ANSWER KEY																			
1.	(2)	2.	(2)	3.	(2)	4.	(1)	5.	(1)	6.	(4)	7.	(1)	8.	(2)	9.	(2)	10.	(2)
11.	(4)	12.	(2)	13.	(1)	14.	(4)	15.	(1)	16.	(1)	17.	(2)	18.	(4)	19.	(2)	20.	(3)
21.	(1)	22.	(3)	23.	(3)	24.	(3)	25.	(1)	26.	(2)	27.	(4)	28.	(2)	29.	(1)	30.	(1)

CDS PYQ

1. If the arms of one angle are respectively parallel to the arms of another angle , then the two angles are
(a) Neither equal nor supplementary
(b) Not equal but supplementary
(c) Equal but not supplementary
(d) Either equal or supplementary
[CDS 2013(I)]

2. The side BC of a ΔABC is produced to D, bisectors of the ∠ABC and ∠ACD meet at P. if ∠BPC = x° and ∠BAC = y°, then which one of the following option is correct?
(a) x° = y° (b) x° + y° = 90°
(c) x° + y° = 180° (d) 2x° = y°
[CDS 2013(I)]

3. ABC is a right angled triangle such that AB = a – b, BC = a and CA = a + b. D is a point on BC such that BD = AB. The ratio of BD : DC for any value of a and b is given by:
(a) 3 : 2 (b) 4 : 3
(c) 5 : 4 (d) 3 : 1
[CDS 2013(I)]

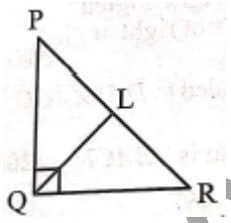
4. Let ABC be an equivalent triangle. If the side BC is produced to the point D so that BC = 2 CD, then AD^2 is equal to:
[CDS 2013(I)]
(a) 3 CD^2 (b) 4 CD^2
(c) 5 CD^2 (d) 7 CD^2

5. ABC is a triangle, where BC = 2AB, ∠C = 30° and ∠A = 90°. The magnitude of the side AC is:
(a) $\frac{2BC}{3}$ (b) $\frac{3BC}{4}$
(c) $\frac{BC}{\sqrt{3}}$ (d) $\frac{\sqrt{3}BC}{2}$
[CDS 2013(I)]

6. The bisectors BI and CI of the ∠B and ∠C of a ΔABC meet in *I*. What is ∠BIC equal to?
(a) $90°-\frac{A}{4}$ (b) $90°+\frac{A}{4}$
(c) $90°-\frac{A}{2}$ (d) $90°+\frac{A}{2}$
[CDS 2013(I)]

7. In a ΔABC, ∠BCA = 90° and CD is perpendicular to AB. If AD = 4 cm and BD = 9cm, then the value of DC will be:
(a) $\sqrt{18}cm$ (b) $\sqrt{20}cm$
(c) $\sqrt{65}cm$ (d) 6 cm
[CDS 2013(I)]

8.



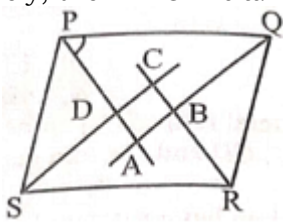
In the figure given above, ∠PQR= 90° and QL is a median, PQ = 5cm and QR = 12 cm. Then, QL is equal to:
(a) 5cm (b) 5.5cm
(c) 6cm (d) 6.5cm
[CDS 2013(I)]

9. In a right angled ΔABC, ∠C = 90° and CD is perpendicular to AB. If AB× CD = CA × CB, then $\frac{1}{CD^2}$ is equal to:
(a) $\frac{1}{AB^2}-\frac{1}{CA^2}$ (b) $\frac{1}{AB^2}-\frac{1}{CB^2}$
(c) $\frac{1}{BC^2}+\frac{1}{CA^2}$ (d) $\frac{1}{BC^2}-\frac{1}{CA^2}$
[CDS 2013(I)]

10. Each side of the equilateral triangle is 6cm. Its altitude is:
(a) $6\sqrt{3}cm$ (b) $3\sqrt{3}cm$
(c) $2\sqrt{3}cm$ (d) $\sqrt{3}cm$
[CDS 2013(I)]

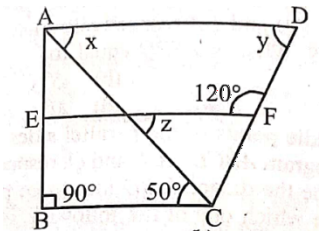
11. ABCD is a trapezium with parallel sides AB = 2 cm and DC = 3 cm. E and F are the mid points of the non parallel sides. The ratio of area of ABFE to area of EFCD is:
(a) 9 : 10 (b) 8 : 9
(c) 9 : 11 (d) 11 : 9
[CDS 2013(I)]

12. In the figure given below, PQRS is a parallelogram. If AP, AQ, CR and CS are bisectors of ∠P, ∠Q, ∠R and ∠S respectively, then ABCD is a:



(a) Square (b) Rhombus
(c) Rectangle (d) None of these
[CDS 2013(I)]

13. In the figure given above, ABCD is a trapezium. EF is parallel to AD and BG. ∠y is equal to:



(a) 30° (b) 45°
(c) 60° (d) 65°

[CDS 2013(I)]

14. Consider a circle with centre at O and radius r. Points A and B lies on its circumference and a point M lies outside of it such that M, A and O lies on the same straight line. Then, the ratio of MA to MB is: Then, the ratio of MA to MB is:

[CDS 2013(I)]

(a) Equal to 1 (b) Equal to r
(c) Greater than 1 (d) Less than 1

15. Consider the following statements:
I. The tangent of a circle is a line that meets the circle in one and only one point.
II. The tangent of a circle at the end point of the diameter is perpendicular to the diameter.
Which of the above statements is/are correct?

(a) Only I (b) Only II
(c) Both I and II (d) Neither I nor II

[CDS 2013(I)]

16. Consider the following statements:
I. If G is the centroid of ΔABC, then GA=GB =GC
II. If H is the ortho-centre of ΔABC, then HA = BH = HC
Which of the statements given above is/are correct?

(a) Only I (b) Only II
(c) Both I and II (d) Neither I nor II

[CDS 2013(II)]

17. If the bisector BI and CI of the angles B and C of a ΔABC meet at the point I, then what is ∠BIC equal to?

(a) 2A (b) $90°+\frac{A}{2}$

(c) $90°-\frac{A}{2}$ (d) 90° + A

[CDS 2013(II)]

18. E is the mid-point of the median AD of a ΔABC, if BE produced meets the side AC at F, then CF is equal to:

(a) $\frac{AC}{3}$ (b) $\frac{2AC}{3}$

(c) $\frac{AC}{3}$ (d) None of these

[CDS 2013(II)]

19. A ΔDEF is formed by joining the mid points of the sides of ΔABC. Similarly, a ΔPQR is formed by joining the mid points of the sides of the ΔDEF. If the sides of the ΔPQR are of length 1,2 and 3 units, what is the perimeter of the ΔABC?
(a) 18 units
(b) 24 units
(c) 48 units
(d) Cannot be determined

[CDS 2013(II)]

20. PQR is an equilateral triangle is the point of intersection of altitudes PL, QM and RN. If OP = 8cm, then what is the perimeter of the ΔPQR?

(a) $8\sqrt{3}cm$ (b) $12\sqrt{3}cm$
(c) $16\sqrt{3}cm$ (d) $24\sqrt{3}cm$

[CDS 2013(II)]

21. In a ΔABC, ∠B = 90° and ∠C = 2 ∠A, then what is AB^2 equal to?

(a) $2BC^2$ (b) $3BC^2$
(c) $4BC^2$ (d) $5BC^2$

[CDS 2013(II)]

22. The side AC of a ΔABC is produced to D such that BC = CD. If ΔACB is 70°, then what is ΔADB equal to?

(a) 35° (b) 45°
(c) 70° (d) 110°

[CDS 2013(II)]

23. Consider the following statements:
I. If the diagonals of a parallelogram ABCD are perpendicular, then ABCD may be a rhombus
II. If the diagonals of a quadrilateral ABCD are equal and perpendicular, then ABCD is a square
Which of the statements given below is/are correct?

[CDS 2013(II)]

(a) Only I (b) Only II
(c) Both I and II (d) Neither I nor II

24. A quadrilateral ABCD is inscribed in a circle. If AB is parallel to CD and AC = BD, then the quadrilateral must be a:

(a) Parallelogram (b) Rhombus
(c) Trapezium (d) None of these

[CDS 2013(II)]

25. ABCD is a quadrilateral such that BC = BA and CD > AD. Which one of the following is correct?
(a) ∠BAD = ∠BCD (b) ∠BAD < BCD
(c) ∠BAD > ∠BCD (d) None of these

[CDS 2013(II)]

26. Consider the following statements in respect of two chords XY and ZT of a circle intersecting at P.
I. PX. PY = PZ. PT
II. PXZ and PTY are similar triangles
Which of the above statements is/are correct?
(a) Only I (b) Only II
(c) Both I and II (d) Neither I nor II

[CDS 2013(II)]

27. The diameter of a circle with centre at C is 50 cm. CP is a radial segment of the circle. AB is a chord perpendicular to CP and passes through P. CP produced intersects the circle at D. If DP = 18 cm, then what is the length of AB?
(a) 24cm (b) 32cm
(c) 40cm (d) 48cm

[CDS 2013(II)]

28. Consider the following statements:
I. The perpendicular bisector of a chord of a circle does not pass through the centre of the circle
II. The angle in a semi-circle is a right angle
Which of the above statements is/are correct?

[CDS 2013(II)]

(a) Only I (b) Only II
(c) Both I and II (d) Neither I nor II

29. ABC is an equilateral triangle inscribed in a circle. D is any point on the arc BC. What is ∠ADB equal to?
(a) 90° (b) 60°
(c) 45° (d)None of the above

[CDS 2013(II)]

30. ABC and XYZ are two similar triangles with ∠C = ∠Z, whose areas are respectively 32cm^2 and 60.5cm^2. If XY = 7.7 cm, then what is AB equal to?
(a) 5.6cm (b) 5.8cm
(c) 6.0cm (d) 6.2cm

[CDS 2013(II)]

31. ABC is a triangle right angled at A and a perpendicular AD is drawn on the hypotenuse BC. What is BC.AD equal to?
(a) AB.AC (b) AB.AD
(c) CA.CD (d) AD.BD

[CDS 2013(II)]

32. The height of two trees are x and y, where x>y. the tops of the trees are at a distance z apart. If s is the shortest distance between the trees, then what is s^2 equal to?
(a) $x^2 + y^2 - z^2 - 2xy$ (b) $x^2 + y^2 - z^2$
(c) $x^2 + y^2 + z^2 - 2xy$ (d) $z^2 - x^2 - y^2 + 2xy$

[CDS 2013(II)]

33. The three sides of a triangle are 15, 25, x units. Which one of the following is correct?
(a) $10 < x < 40$ (b) $10 \le x \le 40$
(c) $10 \le x < 40$ (d) $10 < x \le 40$

[CDS 2014(I)]

34. Which one of the following is Pythagorean triple in which one side differs from the hypotenuse by two units?
(a) $(2n+1, 4n, 2n^2 + 2n)$
(b) $(2n, 4n, n^2 + 1)$
(c) $(2n^2, 2n, 2n + 1)$
(d) $(2n, n^2 - 1, n^2 + 1)$
Where, n is a positive real number?

[CDS 2014(I)]

35. The sides of a right angled triangle are equal to three consecutive numbers expressed in centimeter. What can be the area of such a triangle?
(a) 6cm^2 (b) 8cm^2
(c) 10cm^2 (d) 12cm^2

[CDS 2014(I)]

36. If triangles ABC and DEF are similar such that 2AB = DE and BC = 8cm, then what is EF equal to?
(a) 16cm (b) 12cm
(c) 10cm (d) 8cm

[CDS 2014(I)]

37. The sides of a triangle are in geometric progression with common ratio r < 1. If the triangle is a right angled triangle, the square of common ratio is given by:
(a) $\frac{\sqrt{5}+1}{2}$ (b) $\frac{\sqrt{5}-1}{2}$
(c) $\frac{\sqrt{3}+1}{2}$ (d) $\frac{\sqrt{3}-1}{2}$

[CDS 2014(I)]

38. In a ΔABC, AD is a perpendicular of BC and BE is perpendicular to AC. Which of the following is correct?
(a) CE × CB = CA × CD
(b) CE × CA = CD × CB
(c) AD × BD = AE × BE
(d) AB × AC = AD × BE

[CDS 2014(I)]

39. Let ABC is triangle right angled at B. If AB = 6cm and BC = 8cm, then what is the length of the circum-radius of the ΔABC?

[CDS 2014(I)]

(a) 10cm (b) 7cm

(c) 6cm (d) 5cm

40. If AD is the internal angular bisector of ΔABC with AB = 3 cm and AC = 1 cm then what is BD : BC equal to?

[CDS 2014(I)]

(a) 1:3 (b) 1:4
(c) 2:3 (d) 3:4

41. AB is a straight line, C and D are points the same side of AB such that AC is perpendicular to AB and BD is perpendicular to AB. Let AD and BC meet at E. What is $\frac{AE}{AD}+\frac{BE}{BC}$ equal to?

[CDS 2014(I)]

(a) 2 (b) 1.5
(c) 1 (d) None of these

42. Two light rods AB = a + b, CD = a – b symmetrically lying on a horizontal AB. There are kept intact by two strings AC and BD. The perpendicular distance between rods is a. The length of AC is given by:

[CDS 2014(I)]

(a) a (b) b
(c) $\sqrt{a^2-b^2}$ (d) $\sqrt{a^2+b^2}$

43. If PQRS be a rectangle such PQ = $\sqrt{3}$ QR. Then, what is ∠PRS equal to?

[CDS 2014(I)]

(a) 60° (b) 45°
(c) 30° (d) 15°

44. In a trapezium, the two non-parallel sides are equal in length, each being of 5cm. The parallel sides are at a distance of 3 cm apart. If the smaller side of the parallel sides is of length 2cm, then the sum of the diagonals of the trapezium is:

[CDS 2014(I)]

(a) $10\sqrt{5}$ cm (b) $6\sqrt{5}$ cm
(c) $5\sqrt{5}$ cm (d) $3\sqrt{5}$ cm

45. Let ABCD be a parallelogram. Let P, Q, R and S be the mid points of sides AB, BC, CD and DA respectively. Consider the following statements.

I. Area of triangle APS < Area of triangle DSR, if BD < AC.
II. Area of triangle ABC = 4 (Area of triangle BPQ)

Select the correct answer using the codes given below:

[CDS 2014(I)]

(a) Only I (b) Only II
(c) Both I and II (d) Neither I nor II

46. Consider the following statement:

I. Let ABCD be a parallelogram which is not a rectangle, then $2(AB^2+BC^2) \neq AC^2 + BD^2$
II. If ABCD is a rhombus with AB=4cm, then $AC^2 + BD^2 = n^3$ for some positive integer n.

Which of the above statements is/are correct?

[CDS 2014(I)]

(a) Only I (b) Only II
(c) Both I and II (d) Neither I nor II

47. ABCD is a parallelogram, E is a point on BC such that BE : EC = m : n. If AE and DB intersect in F, then what is the ratio of the area of ΔFEB to the area of ΔAFD?

[CDS 2014(I)]

(a) m/n (b) $(m/n)^2$
(c) $(n/m)^2$ (d) $[m/(m+n)]^2$

48. A circle of radius 10 cm has an equilateral triangle inscribed in it. The length of the perpendicular drawn from the centre to any side of the triangle is

[CDS 2014(I)]

(a) 2.5√3 cm (b) 5√3 cm
(c) 10√3 cm (d) None of these

49. AB and CD are two chords of a circle meeting externally at P. Then, which of the following is/are correct?

I . PA × PD = PC × PB
II. ΔPAC and ΔPDB are similar.

Select the correct answer using the codes given below.

[CDS 2014(I)]

(a) Only I (b) Only II
(c) Both I and II (d) Neither I nor II

50. In a ABC, AB= BC= CA. The ratio of the radius of the circum-circle to that of the in-circle is

[CDS 2014(I)]

(a) 2 : 1 (c) 3 : 1
(c) 3 : 2 (d) None of these

51. Three straight lines are drawn through the three vertices of a ΔABC, the line through each vertex being parallel to the opposite side. The ΔDEF is bounded by these parallel lines:

Consider the following statements in respect of the ΔDEF.

1. Each side of ΔDEF is double the side of the ΔABC to which it is parallel
2. Area of ΔDEF is four times the area of ΔABC

Which of the above statements is/are correct?

[CDS 2014(II)]

(a) Only 1 (b) Only 2
(c) Both 1 and 2 (d) Neither 1 nor 2

52. In a ΔABC, if ∠B = 2 ∠C = 2∠A. Then what is the ratio of AC to BC?

[CDS 2014(II)]

(a) $\sqrt{2}:1$ (b) $\sqrt{3}:1$
(c) 1 : 1 (d) $1:\sqrt{2}$

53. For a triangle, the radius of the circum-circle is double the radius of the inscribed circle, then which one of the following is correct?

[CDS 2014(II)]

(a) The triangle is a right angled
(b) The triangle is an isosceles
(c) The triangle is an equilateral
(d) None of the above

54. Consider the following statements in respect of an equilateral triangle:

[CDS 2014(II)]

1. The altitudes are congruent
2. The three medians are congruent
3. The centroid bisects the altitude

Which of the above statements are correct?

(a) 1 and 2 (b) 2 and 3
(c) 1 and 3 (d) 1, 2 and 3

55. Consider the following:
1.ABC and DEF are triangles in a plane such that AB is parallel to DE, BC is parallel to EF and CA is parallel to FD.
Statement I if ∠ABC is a right angle, then ∠DEF is also a right angle
Statement II Triangles of the type ABC and DEF are always congruent
Which one of the following is correct in respect of the above statements?

[CDS 2014(II)]

(a)Statement I and II are correct and Statement II is the correct explanation of Statement I
(b)Statement I and II are correct and Statement II is not the correct explanation of Statement I
(c)Statement I is correct and Statement II is incorrect
(d)Statement I is incorrect and Statement II is correct

56. Let the incircle to a ΔABC touch BC, AC and AB respectively at the point X, Y and Z.
Statement I if AB > BC then AB + AZ < BC + XC
Statement II AZ = AY

[CDS 2014(II)]

Which one of the following is correct in respect of the above statements?
(a)Statement I and II are correct and Statement II is the correct explanation of Statement I
(b)Statement I and II are correct and Statement II is not the correct explanation of Statement I
(c)Statement I is correct and Statement II is incorrect
(d)Statement I is incorrect and Statement II is correct

57. Let ABC be a triangle in which ∠ACB = 60° and AC = x < BC. Let the circle with centre at C and radius x meet BC at D. Let CF be the perpendicular drawn from C meeting AD at F.
Statement I ΔACD is isosceles but not equilateral
Statement II DF = x/2
Which one of the following is correct in respect of the above statements?

[CDS 2014(II)]

(a)Statement I and II are correct and Statement II is the correct explanation of Statement I
(b)Statement I and II are correct and Statement II is not the correct explanation of Statement I
(c)Statement I is correct and Statement II is incorrect
(d)Statement I is incorrect and Statement II is correct

58. Let ABCD be a parallelogram. Let X and Y be the mid points of the sides BC and AD, respectively. Let M and N be the mid points of the sides AB and CD, respectively.
Consider the following statements:
1. The straight line MX cannot be parallel to YN
2. The straight lines AC, BD, XY and MN meet at a point.

Which of the above statements is/are correct?

[CDS 2014(II)]

(a) Only 1 (b) Only 2
(c) Both 1 and 2 (d) Neither 1 nor 2

Direction (for next three): Read the following information carefully and answer the given questions that follow.
A piece of land is in the form of a parallelogram and the perimeter of the land is 86m. The length of one side exceeds the other by 13 m and one of the diagonals is 41m.

[CDS 2014(II)]

59. What is the area of the parallelogram?
(a) $63m^2$ (b) $96m^2$
(c) $126m^2$ (d) $252m^2$

60. What is the shorter height of the parallelogram?
(a) 9.0m (b) 7.5m
(c) 5.5m (d) 4.5m

61. Consider the following statements:
1. The difference between the diagonals of the parallelogram is more than 20 m
2. The difference between the height of the parallelogram is more than 10 m.
Which of the above statements is/are correct?

[CDS 2014(II)]

(a) Only 1 (b) Only 2
(c) Both 1 and 2 (d) Neither 1 nor 2

Direction (for next two): Read the following information carefully and answer the given questions that follow.
ABCD is a trapezium, in which AB is parallel to CD. Let M be the mid-point of BC.

62. Consider the following statements:
I. Area of ΔADM + Area of ΔDCM is equal to three fourth of the area of trapezium ABCD, if AB = CD
II. Area of ΔDCM + area of ΔABM is always greater than half of the area of trapezium ABCD.
Which of the above statements is/are correct?

[CDS 2014(II)]

(a) Only 1 (b) Only 2
(c) Both 1 and 2 (d) Neither 1 nor 2

63. Consider the following statements:
I. Area of ΔADM – Area of ΔABM is always equal to area of ΔDCM, if AB = CD.
II. Area of ΔABM is equal to one eight of area of trapezium ABCD, if AB = CD.
Which of the above statements is/are correct?

[CDS 2014(II)]

(a) Only 1 (b) Only 2
(c) Both 1 and 2 (d) Neither 1 nor 2

64. ABCD is a parallelogram. P and R are the mid points of DC and BC, respectively. The line PR intersects the diagonal AC at Q. The distance CQ will be :

[CDS 2014(II)]

(a) AC/4 (b) BD/3
(c) BD/4 (d) AC/3

65. Bisectors of two adjacent angles A and B of a quadrilateral ABCD intersect each other at a point P. Which one of the following is correct?

[CDS 2014(II)]

(a) $2\angle APB = \angle C + \angle D$
(b) $\angle APB = \angle C + \angle D$
(c) $\angle APB = 180° - (\angle C + \angle B)$
(d) $\angle APB = 180° - (\angle C + \angle D)$

66. If the chord of an arc of a circle is of length x, the height of the arc is y and the radius of the circle is z. Then, which one of the following is correct?

[CDS 2014(II)]

(a) $y(2z-y) = x^2$ (b) $y(2z-y) = 4x^2$
(c) $2y(2z-y) = x^2$ (d) $4y(2z-y) = x^2$

67. The sides of a triangle are in the ratio $\frac{1}{2}:\frac{1}{3}:\frac{1}{4}$. If its perimeter is 52cm, then what is the length of the smallest side?

[CDS 2014(II)]

(a) 9cm (b) 10cm
(c) 11cm (d) 12cm

68. In a triangle ABC, AD is the median through A and E is the midpoint of AD, and BE produced meets AC at F. Then AF is equal to:

[CDS 2014(II)]

(a) AC/5 (b) AC/4
(c) AC/3 (d) AC/2

69. Let OA, OB, OC and OD are rays in the anticlockwise direction such that ∠AOB = ∠COD = 100°, ∠BOC = 82° and ∠AOD = 78°. Consider the following statements :

I. AOC and BOD are lines
II. ∠BOC and ∠AOD are supplementary
Which of the above statements is/are correct?

[CDS 2015(I)]

(a) Only 1 (b) Only 2
(c) Both 1 and 2 (d) Neither 1 nor 2

70. The angles of a triangle are in the ratio 4 : 1 : 1. Then the ratio of the largest side to the perimeter is:

[CDS 2015(I)]

(a) $\frac{2}{3}$ (b) $\frac{1}{2+\sqrt{3}}$
(c) $\frac{\sqrt{3}}{2+\sqrt{3}}$ (d) $\frac{2}{1+\sqrt{3}}$

71. Let a, b, c be the sides of a right triangle, where c is the hypotenuse. The radius of the circle which touches the sides of the triangle is:

[CDS 2015(I)]

(a) (a + b – c)/2 (b) (a + b + c)/2
(c) (a + 2b +2c)/2 (d) (2a + 2b – c)/2

72. The area of the largest triangle that can be inscribed in a semicircle of radius r is:

[CDS 2015(I)]

(a) r^2 (b) $2r^2$
(c) $3r^2$ (d) $4r^2$

73. Consider the following statements:
1. Let D be a point on the side BC of a triangle ABC. If area of triangle ABD = area of triangle ACD, then for all points O on AD, area of triangle ABO = area of triangle ACO.
2. If G is the point of concurrence of the medians of a triangle ABC, then area of triangle ABG = area of triangle BCG = area of triangle ACG.
Which of the above statements is/area correct?

[CDS 2015(I)]

(a) 1 Only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

74. If each interior angle of a regular polygon is 135°, then the number of diagonals of the polygon is equal to:

[CDS 2015(I)]

(a) 54 (b) 48
(c) 20 (d) 18

75. AD is the diameter of a circle and AB is a chord. If AD = 34 cm, AB = 30cm, the distance of AB from the center of the circle is:

[CDS 2015(I)]

(a) 17cm (b) 15cm
(c) 13cm (d) 8cm

76. If a star figure is formed by elongating the sides of a regular pentagon, then the measure of each angle at the angular points of the star figure is:

[CDS 2015(I)]

(a) 36° (b) 35°
(c) 32° (d) 30°

77. The area of a rhombus with side 13cm and one diagonal 10cm will be:

[CDS 2015(I)]

(a) 140square cm (b) 13 square cm
(c) 120 square cm (d) 110 square cm

78. The diagonals of a trapezium are at right angles, and the slant sides, if produced, form an equilateral triangle with the greater of the two parallel sides. If the area of the trapezium is 16 square cm, then the distance between the parallel sides is:

[CDS 2015(I)]

(a) 2cm
(b) 4cm
(c) 8cm
(d)cannot be determined due to insufficient data

79. Two circles, each of radius r, with centres P and O, are such that each circle passes through the centre of the other circle. Then the area common to the circles is less than one-third of the sum of the areas of the two circles.

[CDS 2015(I)]

(a) $\frac{\sqrt{3}r^2}{4}$ (b) $\frac{\sqrt{3}r^2}{3}$
(c) $\frac{\sqrt{3}r^2}{2}$ (d) $\sqrt{3}r^2$

80. Three equal circles each of diameter d are drawn on a plane in such a way that each circle touches the other two circles. A big circle is drawn in such a manner that it touches each of the small circles internally. The area of the big circle is

[CDS 2015(I)]

(a) πd^2 (b) $\pi d^2\left(2-\sqrt{3}\right)^2$

(c) $\frac{\pi d^2\left(\sqrt{3}+1\right)^2}{2}$ (d) $\frac{\pi d^2\left(\sqrt{3}+2\right)^2}{12}$

81. If the angle between the radii of a circle is 130°, then the angle between the tangents at the ends of the radii is

[CDS 2015(I)]

(a) 90° (b) 70°
(c) 50° (d) 40°

82. Out of two concentric circles, the diameter of the outer circle is 26 cm and the chord MN of length 24cm is tangent to the inner circle. The radius of the inner circle

[CDS 2015(I)]

(a) 5 cm (b) 6 cm
(c) 8 cm (d) 10 cm

83. ABCD is a parallelogram, where AB : AD = 2:1. One of the angles of the parallelogram is 60°. The two diagonals are in the ration.

[CDS 2015(I)]

(a) 7 : 3
(b) $\sqrt{7}:\sqrt{3}$
(c) 7 : 5
(d) None of the above

84. The sides of a triangle are 25cm, 39cm and 56cm. The perpendicular from the opposite vertex on the side of 56cm is:

[CDS 2015(I)]

(a) 10cm (b) 12cm
(c) 15cm (d) 16cm

85. From a circular piece of cardboard of radius 3cm, two sectors of 40° each have been cut off. The area of the remaining portion is:

[CDS 2015(I)]

(a) 11 square cm (b) 22 square cm
(c) 33 square cm (d) 44 square cm

86. Consider the following statements:
1. If non-parallel sides of a trapezium are equal, then it is cyclic.
2. If the chord of a circle is equal to its radius, then the angle subtended by this chord at a point in major segment is 30°.
Which of the above statements is/are correct?

[CDS 2015(I)]

(a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

87. The point O is equidistant from the three sides of a triangle ABC. Consider the following statements:
1. ∠OAC + ∠OCB + ∠OBA = 90°
2. ∠BOC = 2 ∠BAC
3. The perpendiculars drawn from any point on OA to AB and AC are always equal
Which of the above statements are correct?

[CDS 2015(II)]

(a) 1 and 2 only (b) 2 and 3 only
(c) 1 and 3 only (d) 1, 2 and 3

88. ABCD is a parallelogram with AB and AD as adjacent sides. If ∠A = 60° and AB = 2AD, then the diagonal BD will be equal to:

[CDS 2015(II)]

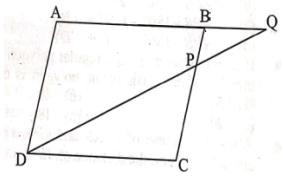
(a) $\sqrt{2}$ AD (b) $\sqrt{3}$ AD
(c) 2AD (d) 3AD

89. If X is any point within a square ABCD and on AX a square AXYZ is described, which of the following is/are correct?
1. BX = DZ or BZ = DX
2. ∠ABX = ∠ADZ or ∠ADX = ∠ABZ
Select the correct answer using the code given below:

[CDS 2015(II)]

(a) 1Only (b) 2 Only
(c) Both 1 and 2 (d) Neither 1 nor 2

90.



In the above figure, ABCD is a parallelogram. P is a point on BC such that PB : PC = 1 : 2. DP and AB when both produced meet at Q. If area of triangle BPQ is 20 square unit, the area of triangle DCP is:

[CDS 2015(II)]

(a) 20 square unit
(b) 30 square unit
(c) 40 square unit
(d) None of the above

91. A circle of radius r is inscribed in a regular polygon with n sides (the circle touches all sides of the polygon). If the perimeter of the polygon is p, then the area of the polygon is:

[CDS 2015(II)]

(a) (p + n) r
(b) (2p–n)r
(c) pr

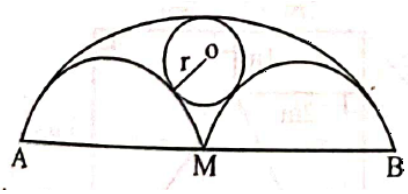
(d) None of the above

92. The two adjacent sides of a cyclic quadrilateral are 2 cm and 5cm and the angle between them is 60°. If the third side is 3 cm, then the fourth side is of length.

[CDS 2015(II)]

(a) 2cm (b) 3cm
(c) 4cm (d) 5cm

93.

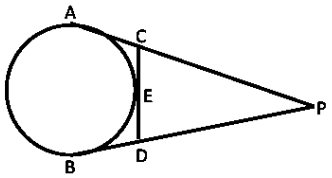


AB is a line segment of length 2a, with M as mid-point. Semicircles are drawn on one side with AM, MB and AB as diameter as shown in the above figure. A circle with centre O and radius r is drawn such that this circle touches all the three semicircles. The value of r is:

[CDS 2015(II)]

(a) $\frac{2a}{3}$ (b) $\frac{a}{2}$
(c) $\frac{a}{3}$ (d) $\frac{a}{4}$

94.



From an external point P tangents PA and PB are drawn to the circle as shown in the above figure. CD is the tangent to the circle at E. If AP = 16 cm, then the perimeter of the triangle PCD is equal to:

[CDS 2015(II)]

(a) 24cm (b) 28cm
(c) 30cm (d) 32cm

95. Chord CD intersects the diameter AB of a circle at right angle at a point P in the ratio 1 : 2. If diameter of circle is D then CD is equal to:

[CDS 2015(II)]

(a) $\frac{\sqrt{2d}}{3}$ (b) $\frac{2d}{3}$
(c) $\frac{2\sqrt{2d}}{3}$ (d) $\frac{2\sqrt{3d}}{3}$

96. An equilateral triangle BOC is drawn inside a square ABCD. If angle AOD = 2θ, what is tanθ equal to?

(a) $2-\sqrt{3}$ (b) $1+\sqrt{2}$
(c) $4-\sqrt{3}$ (d) $2+\sqrt{3}$

[CDS 2015(II)]

97. Two poles are placed at *P* and *Q* on either side of a road such that the line joining *P* and *Q* is perpendicular to the length of the road. A person moves x meter away from *P* parallel to the road and places another pole at *R*. Then the person moves further x meter in the same direction and turns and moves a distance *y* meter away from the road perpendicularly, where he finds himself, *Q* and *R* on the same line. The distance between *P* and *Q* (i.e. the width of the road in meter is)

[CDS 2016(I)]

(a) x (b) $\frac{x}{2}$
(c) y (d) $2y$

98. There are five lines in a plane, no two of which are parallel. The maximum number of the points in which they can intersect is.

[CDS 2016(I)]

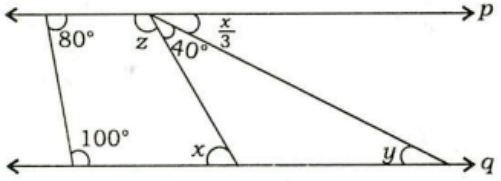
(a) 4 (b) 6
(c) 10 (d) None of the above

99. If a transversal intersects four parallel straight lines, then the number of distinct values of the angles formed will be

[CDS 2016(I)]

(a) 2 (b) 4
(c) 8 (d) 16

100. In the figure given below, P and q are parallel lines. What are the values of the angles x, y and z?



[CDS 2016(I)]

(a) $x = 80^\circ, y = 40^\circ, z = 100^\circ$
(b) $x = 80^\circ, y = 50^\circ, z = 105^\circ$
(c) $x = 70^\circ, y = 40^\circ, z = 110^\circ$
(d) $x = 60^\circ, y = 20^\circ, z = 120^\circ$

101. Let ABC and A'B'C' be two triangles in which AB > A'B', BC>B'C' and CA > C'A'. Let

D, E and F be the mid points of the sides BC, CA and AB respectively. Let D'E' and F be the midpoints of the sides B'C', C'A' and A'B' respectively.
Consider the following statements:
Statement I. AD > A'D', BE > B'E' and CF > C'F' are always true

Statement II.

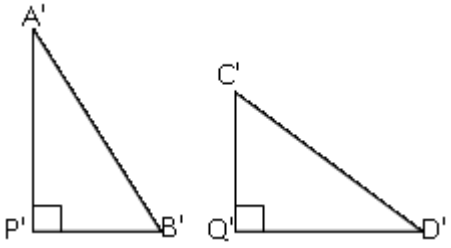
$$\frac{AB^2+BC^2+CA^2}{AD^2+BE^2+CF^2}=\frac{A'B'^2+B'C'^2+C'A'^2}{A'D'^2+B'E'^2+C'F'^2}$$

Which one of the following is correct in respect of the above statements?

[CDS 2016(I)]

(a)Both Statement I and statement II are true and statement II are true and statement II is the correct explanation of statement I.
(b)Both Statement I and statement II are true but statement II is not the correct explanation of statement I.
(c)Statement I is true but statement II is false
(d)Statement I is false but statement II is true

102. Suppose chords AB and CD of a circle intersect at a point P inside the circle. Two right angled triangles A'P'B' and C'Q'D' are formed as shown in the figures below such that A'P' = AP, B'P' = BP, C'Q' = CP, D'Q' = DP and ∠A'P'B' = 90° = ∠C'Q'D'.



Which of the following statements are not correct?
1. A'P'B' and C'Q'D' are similar triangles but need not be congruent
2. A'P'B' and C'Q'D' are congruent triangles
3. A'P'B' and C'Q'D' are triangles of same area
4. A'P'B' and C'Q'D' are triangles of same perimeter

Select the correct answer using the code given below:

[CDS 2016(I)]

(a) 2 and 3 only (b) 1 and 3 only
(c) 1, 2 and 4 only (d) 1,2,3 and 4

103. Suppose ABC is a triangle with AB of unit length D and E are the points lying on AB and AC respectively such that BC and DE are parallel. If the area of triangle ABC is twice the area of triangle ADE, then the length of AD is:

[CDS 2016(I)]

(a) $\frac{1}{2}$ unit (b) $\frac{1}{3}$ unit
(c) $\frac{1}{\sqrt{2}}$ unit (d) $\frac{1}{\sqrt{3}}$ unit

104. Let the triangles ABC and DEF be such that ∠ABC = ∠DEF, ∠ACB = ∠DFB and ∠BAC = ∠EDF. Let L be the midpoint of BC and M be the midpoint of EF. Consider the following statements:
Statements I. Triangle ABL and DEM are similar
Statement II. Triangle ALC is congruent to triangle DMF even in AC ≠ DF
Which one of the following is correct in respect of the above statement?

[CDS 2016(I)]

(a)Statement I and II are correct and Statement II is the correct explanation of Statement I
(b)Statement I and II are correct and Statement II is not the correct explanation of Statement I
(c)Statement I is correct and Statement II is incorrect
(d)Statement I is incorrect and Statement II is correct

105. ABC and DEF are similar triangles. If the ratio of side AB to side DE is $\left(\sqrt{2}+1:\sqrt{3}\right)$, then the ratio of area of triangle ABC to that of triangle DEF is:

[CDS 2016(I)]

(a) $\left(3-2\sqrt{2}\right):3$ (b) $\left(9-6\sqrt{2}\right):2$
(c) $1:\left(9-6\sqrt{2}\right)$ (d) $\left(3+2\sqrt{2}\right):3$

106. In a triangle ABC if A – B = $\frac{\pi}{2}$, then C + 2B is equal to:

[CDS 2016(I)]

(a) $\frac{2\pi}{3}$ (b) $\frac{3\pi}{4}$
(c) π (d) $\frac{\pi}{2}$

107. Let ABC be a triangle in which AB = AC. Let L be the locus of point X inside or on the triangle such that BX = CX.
Which of the following statements are correct?
1. L is a straight line passing through A and in center of triangle ABC is on L
2. L is a straight line passing through A and orthocenter of triangle ABC is on a point L
3. L is a straight line passing through A and in centeroid of triangle ABC is point on L

Select the correct answer using the code given below:

[CDS 2016(I)]

(a) 1 and 2 only (b) 2 and 3 only
(c) 1 and 3 only (d) 1, 2 and 3

108. In a triangle PQR, point X is on PQ and point Y is on PR such that XP = 1.5 units, XQ = 6 unit, PY = 2 units and YR = 8 units. Which of the following are correct?
1. QR = 5XY
2. QR is parallel to XY
3. Triangle PYX is similar to triangle PRQ

Select the correct answer using the code given below:

[CDS 2016(I)]

(a) 1 and 2 only (b) 2 and 3 only
(c) 1 and 3 only (d) 1, 2 and 3

109. A person travels 7km north and then turns right and travels 3 km and further turns right and travels13km. What is the shortest distance of the present position of the person from his starting point?

[CDS 2016(I)]

(a) 6km (b) $3\sqrt{5}km$
(c) 7km (d) $4\sqrt{5}km$

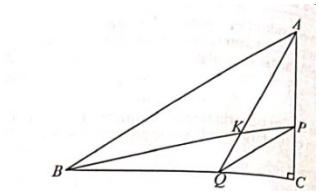
110. ABC is a triangle in which D is the midpoint of BC and E is the midpoint of AD. Which of the following statements is/are correct?
1. The area of triangle ABC is equal to four times the area of triangle BED
2. The area of triangle ADC is twice the area of triangle BED

Select the correct answer using the code given below:

[CDS 2016(I)]

(a) 1only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

111.

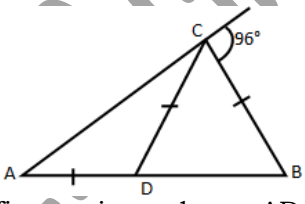


ABC is a triangle right angled at C as shown in the figure above. Which one of the following is correct?

[CDS 2016(I)]

(a) $AQ^2 + AB^2 = BP^2 + PQ^2$
(b) $AQ^2 + PQ^2 = AB^2 + BP^2$
(c) $AQ^2 + BP^2 = AB^2 + PQ^2$
(d) $AQ^2 + AP^2 = BK^2 + KQ^2$

112.



In the figure given above, AD = CD = BC. What is the value of ∠CBD.
(a) 32°
(b) 64°
(c) 78°
(d)Cannot be determined due to insufficient data

[CDS 2016(I)]

113. ABC is an equilateral triangle and X, Y and Z are the points of BC, CA and AB respectively such that BX = CY=AZ.
Which of the following is/are correct?
1. XYZ is an equilateral triangle
2. Triangle XYZ is similar to triangle ABC

Select the correct answer using the code given below:

(a) 1only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

[CDS 2016(I)]

114. A rhombus is formed by joining midpoints of the sides of a rectangle in the suitable order. If the area of the rhombus is 2 square units, then the area of the rectangle is:
(a) $2\sqrt{2}$ square units (b) 4 square units
(c) $4\sqrt{2}$ square units (d) 8 square units

[CDS 2016(I)]

115. If each interior angle of a regular polygon is 140°, then the number of vertices of the polygon is equal to:
(a) 10 (b) 9
(c) 8 (d) 7

[CDS 2016(I)]

116. Consider the following statements:

I. If $n \geq 3$ and $m \geq 3$ are distinct positive integers, then the sum of the exterior angles of a regular polygon of m sides is different from the sum of the exterior angles of a regular polygon of n sides.

II. Let m, n be integers such that $m > n \geq 3$. Then the sum of the interior angles of a regular polygon of m sides is greater than the sum of the interior angles of a regular polygon of n sides, and their sum is $(m+n)\frac{\pi}{2}$.

Which of the above statements is/are correct?

(a) 1Only (b) 2 Only
(c) Both 1 and 2 (d) Neither 1 nor 2

[CDS 2016(I)]

117. Consider the following statements:

1. There exists a regular polygon whose exterior angles is 70°.
2. Let $n \geq 5$. Then the exterior angle of any regular polygon of n sides is acute.

Which of the above statements is/are correct?

(a) 1Only (b) 2 Only
(c) Both 1 and 2 (d) Neither 1 nor 2

[CDS 2016(I)]

118. In a circle of radius 2 unit, a diameter AB intersects a chord of length 2 units perpendicularly at P. If AP > BP, then AP is equal to:

(a) $\left(2+\sqrt{5}\right)units$ (b) $\left(2+\sqrt{3}\right)units$
(c) $\left(2+\sqrt{2}\right)units$ (d) 3 units

[CDS 2016(I)]

119. A truck moves along a circular path and describes 100m when it has traced out 36° at the centre. The radius of the circle is equal to:

(a) $\frac{100}{\pi}m$ (b) $\frac{250}{\pi}m$
(c) $\frac{500}{\pi}m$ (d) $\frac{600}{\pi}m$

[CDS 2016(I)]

120. A tangent is drawn from an external point O to a circle of radius 3 units at P such that OP = 4 units. If C is the centre of the circle, the sine of the angle COP is:

(a) 4/5 (b) 3/4
(c) 3/5 (d) 1/2

[CDS 2016(I)]

121. Consider a circle with centre at O and radius 7cm. Let QR be a chord of length 2cm and let P be the midpoint of QR. Let CD be another chord of the circle passing through P such that ∠CPQ is acute. If M is the midpoint of CD and MP = $\sqrt{24}$ cm, then which of the following statements are correct?

1. If ∠PQD = 135°
2. If CP = m cm and PD = n cm, then m and n are the roots of the quadratic equation $x^2 - 10x + 1 = 0$
3. The ratio of the area of triangle OPR to the area of triangle OMP is $1: 2\sqrt{2}$.

Select the correct answer using the code given below:

(a) 1 and 2 only (b) 2 and 3 only
(c) 1 and 3 only (d) 1, 2 and 3

[CDS 2016(I)]

122. Consider a circle with center at C Let OP, OQ denote respectively the tangents to the circle drawn from a point O outside the circle. Let R be a point on OP and S be a point on OQ such that OR × SQ = OS × RP. Which of the following statement is/are correct?

1. If X is the circle with centre at O and radius OR, and Y is the circle with centre at O and radius OS, then X = Y.
2. ∠POC + ∠QCO = 90°

Select the correct answer using the code given below:

(a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

[CDS 2016(I)]

123. A circular path is made from two concentric circular rings in such a way that the smaller ring when allowed to roll over the circumference of the bigger ring, it takes three full revolutions. If the area of the pathway is equal to n times the area of the smaller ring, then n is equal to:

(a) 4 (b) 6
(c) 8 (d) 10

[CDS 2016(I)]

124. Let ABC be a right angled triangle with BC = 5cm, and AC = 12cm. Let D be a point on the hypotenuse AB such that ∠BCD = 30°. What is length of CD?

(a) $\frac{60}{13}cm$ (b) $\frac{17}{2}cm$
(c) $\frac{120}{5+12\sqrt{2}}cm$ (d) $\frac{120}{5+12\sqrt{3}}cm$

[CDS 2016(II)]

125. In an equilateral triangle another equilateral triangle is drawn inside joining the mid-point of the sides of given equilateral triangle and the process is continued up to 7 times. What is the ratio

of area of fourth triangle to that of seventh triangle?

[CDS 2016(II)]

(a) 256:1 (b) 128:1
(c) 64 :1 (d) 16:1

126. The sides of a triangle are given by $\sqrt{a^2+b^2}, \sqrt{c^2+a^2}$ and (b + c) where, a, b, c are positive. What is the area of the triangle equal to?

[CDS 2016(II)]

(a) $\frac{\sqrt{a^2+b^2+c^2}}{2}$

(b) $\frac{\sqrt{a^2b^2+b^2c^2+c^2a^2}}{2}$

(c) $\frac{a(b+c)}{2}$

(d) $\frac{\sqrt{3\left(a^2b^2+b^2c^2+c^2a^2\right)}}{2}$

127. Two circles touch externally and sum of their areas is 130π cm^2 and distance between their centres is 14 cm. What is the difference in the radii of the circles?

[CDS 2016(II)]

(a) 5 cm (b) 6 cm
(c) 7 cm (d) 8 cm

128. In a circle of radius 3 units, a diameter AB, intersects a chord of length 2 units perpendicularly at P. If AP > BP., then what is the ratio of AP to BP?

[CDS 2016(II)]

(a) 3 + √10 : 3 − √10 (b) 3 + √8 : 3 − √8
(c) 3 + √3 : 3 − √3 (d) 3 : √3

129. If two tangents inclined at an angle 60° are drawn to a circle of radius 3 cm, then what is the length of each tangent?

[CDS 2016(II)]

(a) 3√3 cm (b) √3 cm
(c) 6 cm (d) 2√2 cm

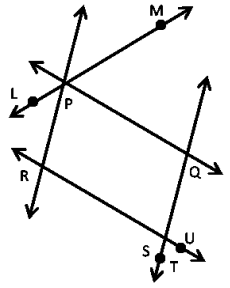
130. ABCDA is a con-cyclic quadrilateral of a circle ABCD with radius r and centre at O. If AB is the diameter and CD is parallel and half of AB and if the circle complete one rotation about the center O, then the locus of the middle point of CD is a circle of radius:

[CDS 2016(II)]

(a) $\frac{3r}{2}$ (b) $\frac{2r}{3}$
(c) $\frac{2\sqrt{3r}}{3}$ (d) $\frac{\sqrt{3r}}{2}$

131. In the figure given below, PQ is parallel to RS and and PR is parallel to QS. If ∠LPR = 35° and ∠UST=70°, then what is ∠MPQ equal to?

[CDS 2017(I)]



(a) 55° (b) 70°
(c) 75° (d) 80°

132. Which one of the following triples does not represent the sides of a triangle?

[CDS 2017(I)]

(a) (3,4,5) (b) (4,7,10)
(c) (3,6,8) (d) (2,3,6)

133. The angles of a triangle are in the ratio 2 : 4:3. The smallest angle of the triangle is

[CDS 2017(I)]

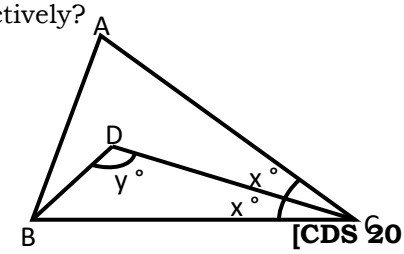
(a) 20° (b) 40°
(c) 50° (d) 60°

134. ABC is a triangle and D is a point on the side BC. If BC = 12 cm, BD = 9 cm and ∠ADC= ∠BAC, then the length of AC is equal to

[CDS 2017(I)]

(a) 5 cm (b) 6 cm
(c) 8 cm (d) 9 cm

135. In the figure given below, ∠A= 80° and ∠ABC=60°. BD and CD bisect angles B and C respectively. What are the values of x and y respectively?

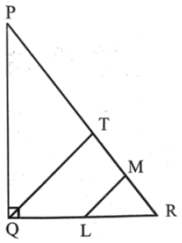


[CDS 2017(I)]

(a) 10 and 130 (b) 10 and 125
(c) 20 and 130 (d) 20 and 125

136. In the figure given below, PQR is a non-isosceles right angled triangle, right angled

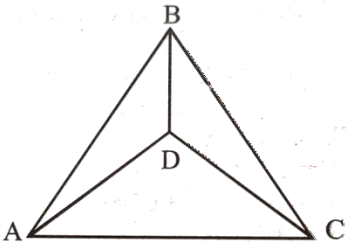
at Q. If LM and QT are parallel and QT=PT, then what is ∠RLM equal to?



[CDS 2017(I)]

(a) ∠PQT (b) ∠LRM
(c) ∠RML (d) ∠QPT

137. In the figure given below, ABC is a triangle with AB = BC and D is an interior point of the triangle ABC such that ∠DAC = ∠DCA.



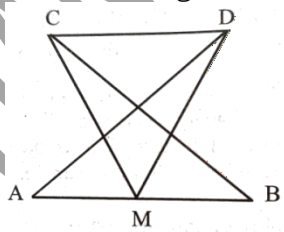
Consider the following statements:
1. Triangle ADC is an isosceles triangle.
2. D is the centroid of the triangle ABC
3. Triangle ABD is congruent to the triangle CBD.

Which of the above statements are correct?

[CDS 2017(I)]

(a) 1and 2 only (b) 2 and 3 only
(c) 1 and 3 only (d) 1,2 and 3

138. In the figure given below, M is the mid-point of AB and ∠DAB=∠CBA and ∠AMC=∠BMD. Then the triangle ADM is congruent to the triangle BCM by:



[CDS 2017(I)]

(a) SAS rule (b) SSS rule
(c) ASA rule (d) AAA rule

139. ABCD is a square X is the mid-point of AB and Y is the mid-point of BC.
Consider the following statements
1. Triangles ADX and BAY are congruent.
2. ∠DXA= ∠AYB.
3. DX is inclined at an angle 60° with AY.
4. DX is not perpendicular to AY.

Which of the above statements are correct?

[CDS 2017(I)]

(a) 2, 3 and 4 only (b) 1, 2 and 4 only
(c) 1, 3 and 4 only (d) 1 and 2 only

140. Let ABCD be a rectangle. Let P, Q, R, S be the mid-points of sides AB, BC, CD, DA respectively. Then the quadrilateral PQRS is a:

[CDS 2017(I)]

(a) Square
(b) Rectangle, but need not be a square
(c) Rhombus, but need not be a square
(d)Parallelogram, but need not be a rhombus

141. ABCDEF is a regular polygon. Two poles at C and D are standing vertically and subtend angles of elevation 30 and 60° at A respectively. What is the ratio of the height of the pole at C to that of the pole at D:

[CDS 2017(I)]

(a) 1 : 1 (b) 1 : $2\sqrt{3}$
(c) $2\sqrt{3}$: 1 (d) 2 : $\sqrt{3}$

142. In a trapezium ABCD, AB is parallel to CD and the diagonals intersect each other at O. What is the ratio of OA to OC equal to?

[CDS 2017(I)]

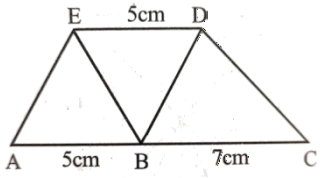
(a) Ratio of OB to OD
(b) Ratio of BC to CD
(c) Ratio of AD to AB
(d) Ratio of AC to BD

143. ABCD is a rectangle. The diagonals AC and BD intersect at O. If AB = 32 cm and AD = 24 cm, then what is OD equal to?

[CDS 2017(I)]

(a) 22 cm (b) 20 cm
(c) 18 cm (d) 16 cm

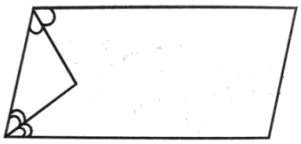
144. In the figure given below, AC is parallel to ED and AB = DE = 5 cm and BC = 7 cm. What is the area ABDE : area BDE : area BCD equal to ?



[CDS 2017(I)]

(a) 10:5:7 (b) 8:4:7
(c) 2:1:2 (d) 8:4:5

145. In the figure given below, PQRS is a parallelogram. PA bisects angle P and SA bisects angle S. What is angle PAS equal to?



[CDS 2017(I)]

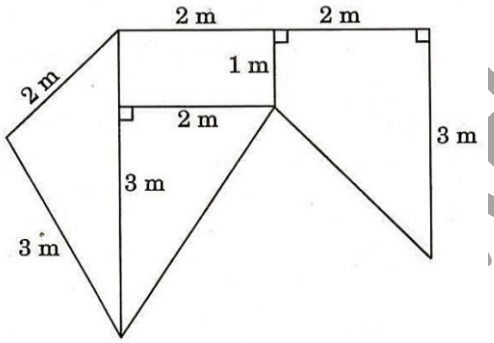
(a) 60° (b) 75°
(c) 90° (d) 100°

146. Two parallel chords of a circle whose diameter is 13 cm are respectively 5 cm and 12 cm in length. If both the chords are on the same side of the diameter, then the distance between these chords is

[CDS 2017(I)]

(a) 5.5 cm (b) 5 cm
(c) 3.5 cm (d) 3 cm

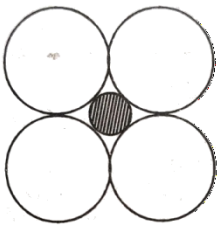
147. A field is divided into four regions as shown in the given figure. What is the area of the field in square metres?



[CDS 2017(I)]

(a) $6+\frac{3}{4}\sqrt{5}$ (b) $5+\frac{3}{2}\sqrt{3}$
(c) $9+\frac{3}{4}\sqrt{15}$ (d) $7+2\sqrt{2}$

148. In the figure given below, D is the diameter of each circle. What is the diameter of the shaded circle?



[CDS 2017(I)]

(a) D $(\sqrt{2}-1)$ (b) D $(\sqrt{2}+1)$
(c) D $(\sqrt{2}+2)$ (d) D $(2-\sqrt{2})$

149. Let P, Q, R be the mid-points of sides AB, BC, CA respectively of a triangle ABC. If the area of the triangle ABC is 5 square units, then the area of the triangle PQR is:

[CDS 2017(I)]

(a) $\frac{5}{3}$ square units
(b) $\frac{5}{2\sqrt{2}}$ square units
(c) $\frac{5}{4}$ square units
(d) 1 square unit

150. Consider the following statements in respect of three, straight lines, A, B and C on a plane.

1. If A and C are parallel and B and C are parallel; then A and B are parallel.
2. If A is perpendicular to C and B is perpendicular to C; then A and B are parallel.
3. If the acute angle between A and C is equal to the acute angles between B and C; then A and B are parallel.

Which of the above statements are correct?

[CDS 2017(II)]

(a) 1, 2 and 3 (b) 1 and 2 only
(c) 1 and 3 only (d) 2 and 3 only

151. In a triangle ABC, AD is perpendicular on BC. If ∠BAC = 90°, AB = c, BC = a, CA = b and AD =p, then which one of the following is correct?

[CDS 2017(II)]

(a) p = abc (b) $p^2 = bc$
(c) p = bc/a (d) p = ab/c

152. In an equilateral triangle ABC, BD is drawn perpendicular to AC. What is BD^2 equal to?

[CDS 2017(II)]

(a) AD^2 (b) $2AD^2$
(c) $3AD^2$ (d) $4AD^2$

153. If PL, QM and RN are the altitudes of triangle PQR whose ortho-centre is O, then Q is the ortho-centre of the triangle

[CDS 2017(II)]

(a) OPQ (b) OQR
(c) PLR (d) OPR

154. In triangle ABC, ∠C=90° and CD is the perpendicular from C to AB.
If $(CD)^{-2} = (BC)^{-2} + (CA)^{-2}$ then which one of the following is correct?

[CDS 2017(II)]

(a) BC.CD=AB.CA
(b) AB. BC=CD.CA
(c) $CA^2 + CB^2 = 2(AD^2 + CD^2)$
(d) AB.CD = BC.CA

155. In a triangle ABC, the medians AD and BE intersect at G. A line DF is drawn parallel to BE such that F is on AC. If AC=9 cm, then what is CF equal to?

[CDS 2017(II)]

(a) 2.25 cm (b) 3 cm
(c) 4.5 cm (d) 6 cm

156. In a triangle PQR, X is a point on PR and Y is a point on QR such that PR = 10 cm, RX = 4 cm, YR = 2 cm, QR=5 cm.
Which one of the following is correct?

[CDS 2017(II)]

(a) XY is parallel to PQ
(b) PQ = 2XY
(c) PX = QY
(d) PQ = 3XY

157. One-fifth of the area of a triangle ABC is cut off by a line DE drawn parallel to BC such that D is on AB and E is on AC. If BC 10 cm, then what is DE equal to?

[CDS 2017(II)]

(a) $\sqrt{5}$ cm (b) $2\sqrt{5}$ cm
(c) $3\sqrt{5}$ cm (d) $4\sqrt{5}$ cm

158. Consider the following statements
1. The point of intersection of the perpendicular bisectors of the side of a triangle may lie outside the triangle.
2. The point of intersection of the perpendiculars drawn from the vertices to the opposite sides of a triangle may lie on two sides.

Which of the above statements is/are correct?

[CDS 2017(II)]

(a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 not 2

159. If a point O is interior of a rectangle ABCD is joined with each of the vertices A, B, C and D, then $OB^2 + OD^2$ will be equal to?

[CDS 2017(II)]

(a) $2OC^2 + OA^2$ (b) $2OC^2 - OA^2$
(c) $OC^2 + OA^2$ (d) $OC^2 + 2OA^2$

160. The diagonals of a rhombus are of length 20 cm and 48 cm. What is the length of a side of the rhombus?

[CDS 2017(II)]

(a) 13 cm (b) 26 cm
(c) 36 cm (d) 39 cm

161. A closed polygon has six sides and one of its angles is 30° greater than each of the other five equal angles. What is the value of one of the equal angles?

[CDS 2017(II)]

(a) 55° (b) 115°
(c) 150° (d) 175°

162. AB and CD are parallel chords of a circle 3 cm apart. If AB= 4 cm, CD = 10 cm, then what is the radius of the circle?

[CDS 2017(II)]

(a) 7 cm (b) $\sqrt{19}$ cm
(c) $\sqrt{29}$ cm (d) 14 cm

163. The diagonals of a cyclic quadrilateral ABCD intersect at P and the area of the triangle APB is 24 square cm. If AB-8 cm and CD = 5 cm, then what is the area of the triangle CPD?

[CDS 2017(II)]

(a) 24 square cm (b) 15 square cm
(c) 12.5 square cm (d) 9.375 square cm

164. The distance between the centres of two circles having radii 9 cm and 4 cm is 13 cm. What is the length of the direct common tangent of these circles?

[CDS 2017(II)]

(a) 12 cm (b) 11 cm
(c) 10 cm (d) 9.5 cm

165. An arc of a circle subtends an angle π at the centre. If the length of the arc is 22 cm, then what is the radius of the circle?

[CDS 2017(II)]

(a) 5 cm (b) 7 cm
(c) 9cm (d) 11 cm

166. There are 8 lines in a plane, no two of which are parallel. What is the maximum number of points at which they can intersect?

[CDS 2017(II)]

(a)15
(b) 21
(c) 28
(d) None of the above

167. The length of a line segment AB is 2 cm. It is divided into two parts at a point C such that $AC^2 = AB \times CB$. What is the length of CB?

[CDS 2018(I)]

(a) $3\sqrt{5}$ cm (b) $3-\sqrt{5}$ cm
(c) $5\sqrt{3}$ cm (d) $\sqrt{5}-1$ cm

168. The locus of a point equidistant from two intersecting lines is **[CDS 2018(I)]**

(a) A straight line
(b) A circle
(c) A pair of straight lines
(d) None of the above

Consider the following for the next two (02) questions:
In a triangle ABC, a, b and c are the lengths of the sides and p, q and r are the lengths of its medians.

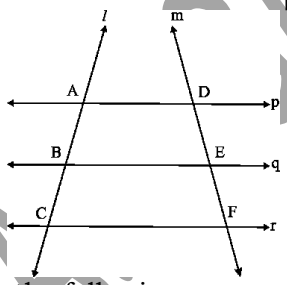
169. Which one of the following is correct? **[CDS 2018(I)]**

(a) 2 (p + q + r) = (a + b + c)
(b) 2 (p + q + r) >3 (a + b + c)
(c) 2 (p + q + r) <3 (a + b + c)
(d) 11 (p + q + r) >10 (a + b + c)

170. Which one of the following is correct? **[CDS 2018(I)]**

(a) (a + b + c) < (p + q + r)
(b) 3(a + b + c) < 4 (p + q + r)
(c) 2(a + b + c) > 3 (p + q + r)
(d) 3 (a + b + c) >4 (p + q + r)

171. In the figure given below, p, q, r are parallel lines; l and are two transversals **[CDS 2018(I)]**



Consider the following:
1. AB : AC = DE : DF
2. AB × EF = BC × DE
Which of the above is/are correct?

(a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

172. ABC is a triangle right angled at C with BC = a and AC = b. If p is the length of the perpendicular from C on AB, then which one of the following is correct? **[CDS 2018(I)]**

(a) $a^2 b^2 = p^2 (a^2 + b^2)$
(b) $a^2 b^2 = p^2 (b^2 - a^2)$
(c) $2a^2 b^2 = p^2 (a^2 + b^2)$
(d) $a^2 b^2 = 2p^2 (a^2 + b^2)$

173. Consider the following statements:
1. The orthocenter of a triangle always lies indie the triangle.
2. The centroid of a triangle always lies inside the triangle.
3. The orthocenter of right angled triangle lies on the triangle.
4. The centroid of a right angled triangles lies on the triangle.
Which of the above statements are correct? **[CDS 2018(I)]**

(a) 1 and 2 (b) 1 and 4
(c) 2 and 3 (d) 2 and 4

174. Consider the following statements:
Two triangles are said to be congruent, if
1. Three angles of the triangle are equal to the corresponding three angles of the other triangle.
2. Three sides of one triangle are equal to the corresponding three sides of the other triangle.
3. Two sides and the included angle of one triangle are equal to the corresponding two sides and the included angle of the other triangle.
4. Two angles and the included side of one triangle are equal to the corresponding two angles and the included side of the other triangle.
Which of the above statements are correct? **[CDS 2018(I)]**

(a) 1, 2 and 3 (b) 1, 3 and 4
(c) 1, 2 and 4 (d) 2, 3 and 4

175. In the equilateral triangle ABC given below, AD = DB and AE = EC. If ℓ is the length of a side of the triangle, then what is the area of the shaded region? **[CDS 2018(I)]**

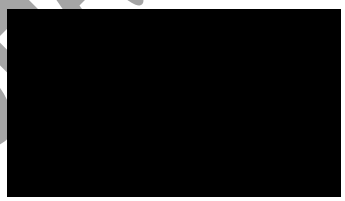
(a) $\frac{3\sqrt{3}\ell^2}{16}$ (b) $\frac{3\ell^2}{16}$
(c) $\frac{3\sqrt{3}\ell^2}{32}$ (d) $\frac{3\ell^2}{32}$

176. Give that the angles of a polygon are all equal and each angle is a right angle.
Statement–1: The polygon has exactly four sides
Statement–2: The sum of the angles of a polygon having n side is (3n – 8) right angles.
Which one of the following is correct is respect of the above statements?
[CDS 2018(I)]
(a)Both Statement – 1 and Statements – 2 are true and Statement – 2 is the correct explanation of Statement – 1
(b)Both Statement – 1 and Statement - 3 are true but Statement – 2 is not correct explanation of Statement – 1
(c)Statement – 1 is true but Statement – 2 is false
(d)Statement – 1 is false but Statement – 2 is true

177. The radii of the circles are 4.5 cm and 3.5 cm respectively. The distance between the centers of the circles is 10 cm. What is the length of the transverse common tangent?
[CDS 2018(I)]
(a) 4 cm (b) 5 cm
(c) 6 cm (d) 7 cm

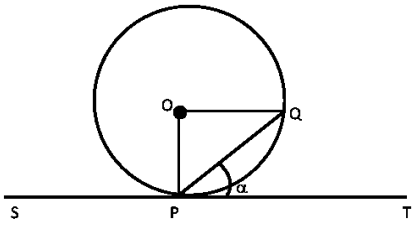
178. The locus of the mid-points of the radii of length 16 cm of a circle is
[CDS 2018(I)]
(a)A concentric circle of radius 8 cm
(b)A concentric circle of radius 16 cm
(c)The diameter of the circle
(d)A straight line passing through the centre of the circle.

179. In the figure given below, XA and XB are two tangents to a circle. If $\angle AXB = 50^\circ$ and AC is parallel to XB, then what is $\angle ACB$ equal to



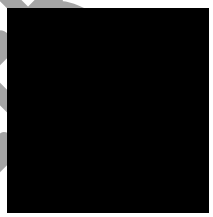
[CDS 2018(I)]
(a) 70° (b) 65°
(c) 60° (d) 55°

180. In the figure given below, SPT is a tangent to the circle at P and O is the centre of the circle. If $\angle QPT = \alpha$, then what is $\angle POQ$ equal to?



CDS 2018(I)]
(a) α (b) 2α
(c) $90^\circ - \alpha$ (d) $180^\circ - 2\alpha$

181. In the figure given below, two equal chords cut at point P. If AB = CD = 10cm, OC = 13 cm (O is the centre of the circle and PB = 3 cm, then what is the length of OP?
[CDS 2018(I)]



(a) 5 cm (b) 6 cm
(c) $2\sqrt{29}$ cm (d) $2\sqrt{37}$ cm

182. ABC is a right angled triangle with base BC and height AB. The hypotenuse AC is four times the length of the perpendicular drawn to it from the opposite vertex. What is tan C equal to:
[CDS 2018(I)]
(a) $2-\sqrt{3}$ (b) $\sqrt{3}-1$
(c) $2+\sqrt{3}$ (d) $\sqrt{3}+1$

183. The number of sides of two regular polygons are in the ratio 5:4. The difference between their interior angles is 9°. Consider the following statements:
1. One of them is a pentagon and the other is a rectangle.
2. One of them is a decagon and the other is an octagon.
3. The sum of their exterior angles is 720°
Which of the above statements is/are correct?
[CDS 2018(II)]
(a) 1 only (b) 2 only
(c) 1 and 3 (d) 2and 3

184. A circle in inscribed in an equilateral triangle of side of length l. The area of any square inscribed in the circle is
[CDS 2018(II)]

(a) $\frac{l^2}{2}$ (b) $\frac{\sqrt{3}l^2}{4}$

(c) $\frac{l^2}{4}$ (d) $\frac{l^2}{6}$

185. The areas of two similar triangles are $(7-4\sqrt{3})$ cm^2 and $(7+4\sqrt{3})$ cm^2 respectively. The ratio of their corresponding sides is

(a) $7-4\sqrt{3}$ (b) $7-3\sqrt{3}$

(c) $5-\sqrt{3}$ (d) $5+\sqrt{3}$

[CDS 2018(II)]

186. The chord of a circle is $\sqrt{3}$ times its radius. The angle subtended by this chord at the minor are is k times the angle subtended at the major are. What is the value of k?

(a) 5 (b) 2

(c) 1/2 (d) 1/5

[CDS 2018(II)]

187. In a triangle ABC, the sides AB, AC are produced and the bisectors of exterior angles of ∠ABC and ∠ACB intersect at D. If ∠BAC = 50°, then ∠BDC is equal to

(a) 115° (b) 65°

(c) 55° (d) 40°

[CDS 2018(II)]

188. If two lines AB and CD interest at O such that ∠ AOC = 5 ∠AOD, then the four angles at O are

(a) $40^\circ, 40^\circ, 140^\circ, 140^\circ$ (b) $30^\circ, 30^\circ, 150^\circ, 150^\circ$

(c) $30^\circ, 45^\circ, 75^\circ, 210^\circ$ (d) $60^\circ, 60^\circ, 120^\circ, 120^\circ$

[CDS 2018(II)]

189. If a point P moves such that the sum of the squares of its distances from two fixed points A and B is a constant, then the locus of the point P is

(a) A straight line

(b) A circle

(c) Perpendicular bisector of AB

(d) An arbitrary curve

[CDS 2018(II)]

190. If ABC is a right-angled triangle with AC as its hypotenuse, then which one of the following is correct?

[CDS 2018(II)]

(a) $AC^3 < AB^3 + BC^3$

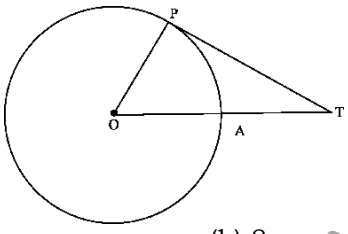
(b) $AC^3 > AB^3 + BC^3$

(c) $AC^3 \leq AB^3 + BC^3$

(d) $AC^3 \geq AB^3 + BC^3$

191. In the figure give below, the radius of the circle is 6 cm and AT = 4 cm. The length of tangent PT is

[CDS 2018(II)]

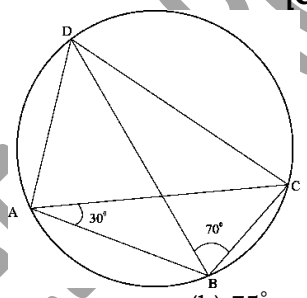


(a) 6 cm (b) 8 cm

(c) 9 cm (d) 10 cm

192. In the figure given below, what is ∠BCD equal to?

[CDS 2018(II)]

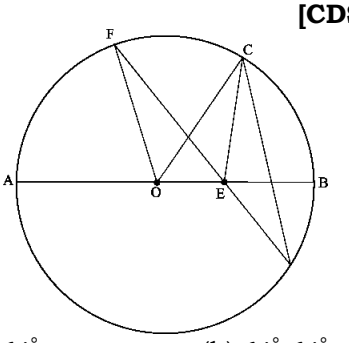


(a) 70° (b) 75°

(c) 80° (d) 90°

193. In the figure give below, AB is the diameter of the circle whose centre is at O. given that ∠ECD = ∠EDC = 32°, then ∠CEF and ∠COF respectively are

[CDS 2018(II)]

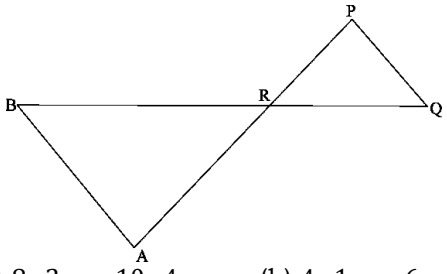


(a) $32^\circ, 64^\circ$ (b) $64^\circ, 64^\circ$

(c) $32^\circ, 32^\circ$ (d) $64^\circ, 32^\circ$

194. In the figure given below, ΔABR ~ ΔPQR. If PQ = 3 cm, AB = 6cm, BR = 8 · 2 cm and PR = 5 · 2 cm, the QR and AR are respectively

[CDS 2018(II)]



(a) 8 · 2 cm , 10 · 4 cm (b) 4 · 1 cm , 6 cm

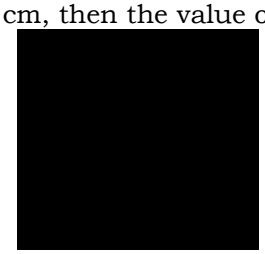
(c) $2 \cdot 6$ cm , $5 \cdot 2$ cm (d) $4 \cdot 1$ cm , $10 \cdot 4$ cm

195. In the figure given below, ABC is a tingle with AB perpendicular BC. Further BD is perpendicular to AC. If AD = 9 cm and DC = 4 cm, then what is the length of BD?

[CDS 2018(II)]

(a) 13/36 cm (b) 36/13cm
(c) 13/2 cm (d) 6 cm

196. In the figure given below ABC is an equilateral triangle with each side of length 30 cm. XY is parallel to BC, XP is parallel to AC and YQ is parallel to AB. If XY + XP + YQ is 40 cm, then the value of PQ is



(a) 5 cm (b) 12 cm
(c) 15 cm (d) 10 cm

[CDS 2018(II)]

197. If the lengths of two parallel chords in a circle of radius 10 cm are 12 cm and 16 cm, then what is the distance between these two chords?
(a) 1 cm or 7 cm (b) 2 cm or 14 cm
(c) 3 cm or 21cm (d) 4cm or 28 cm

[CDS 2019(I)]

198. The corners of a square of side 'a' are cut away so as to form a regular octagon. What is the side of the octagon?
(a) $a(\sqrt{2}-1)$ (b) $a(\sqrt{3}-1)$
(c) $\frac{a}{\sqrt{2}+2}$ (d) $\frac{a}{3}$

[CDS 2019(I)]

199. Three consecutive integers form the lengths of a right-angled triangle. How many sets of such three consecutive integers is/are possible?
(a) Only one (b) Only two
(c) Only three (d) Infinitely many

[CDS 2019(I)]

200. Two circles are drawn with the same centre. The circumference of the smaller circle is 44 cm and that of the bigger circle is double the smaller one. What is the area between these two circles?
(a) 154 square cm (b) 308 square cm
(c) 462 square cm (d) 616 square cm

[CDS 2019(I)]

201. The perimeter of a right-angled triangle is k times the shortest side. If the ratio of the other side to hypotenuse is 4 : 5, the what is the value of k?
(a) 2 (b) 3
(c) 4 (d) 5

[CDS 2019(I)]

202. The angles of a triangle are in the ratio 1 : 1 : 4. If the perimeter of the triangle is k ties its largest side, then what is the value of k?
(a) $1+\frac{2}{\sqrt{3}}$ (b) $1-\frac{2}{\sqrt{3}}$
(c) $2+\frac{2}{\sqrt{3}}$ (d) 2

[CDS 2019(I)]

203. In a circle of radius 8 cm, AB and AC are two chords such that AB = AC = 12 cm. What is the length of chord BC?
(a) $2\sqrt{6}$ cm (b) $3\sqrt{6}$ cm
(c) $3\sqrt{7}$ cm (d) $6\sqrt{7}$ cm

[CDS 2019(I)]

204. Consider the following statements:
1. An isosceles trapezium is always cyclic
2. Any cyclic parallelogram is a rectangle.
Which of the above statements is/are correct?
(a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

[CDS 2019(I)]

205. A ladder is resting against a vertical wall and its bottom is $2 \cdot 5$ m away from the wall. If it slips $0 \cdot 8$ m down the wall, then its bottom will move away from the wall by $1 \cdot 4$ m. What is the length of the ladder?
(a) $6 \cdot 2$ m (b) $6 \cdot 5$ m
(c) $6 \cdot 8$ m (d) $7 \cdot 5$ m

[CDS 2019(I)]

206. Two equal circles intersect such that each passes through the centre of the other. If the length of the common chord od the circles is $10\sqrt{3}$ cm, the what is the diameter of the circle?
(a) 10 cm (b) 15 cm
(c) 20 cm (d) 30 cm

[CDS 2019(I)]

207. Consider the following statements:
1. The number of circles that can be drawn through three non-collinear points is infinity.
2. Angle formed in minor segment of a circle is acute.
Which of the above statements is/are correct?

[CDS 2019(I)]

(a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

208. Consider the following inequalities in respect of any triangle ABC:
1. AC – AB < BC
2. BC – AC < AB
3. AB – BC < AC
Which of the above are correct?
[CDS 2019(I)]
(a) 1 and 2 only (b) 2 and 3 only
(c) 1 and 3 only (d) 1, 2 and 3

209. Consider the following statements
1. The perimeter of a triangle is greater than the sum of its three medians
2. In ant triangles ABC, if D is any point on BC, then AB + BC + CA > 2AD.
Which of the above statements is/are correct?
[CDS 2019(I)]
(a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

Consider the following for the next two (02) item:
An equilateral triangle ABC is inscribed in a circle of radius $20\sqrt{3}$ cm.

210. What is the length of the side of the triangle?
[CDS 2019(I)]
(a) 30 cm (b) 40 cm
(c) 50 cm (d) 60 cm

211. The centroid of the triangle ABC is at a distance d from the vertex A. What is d equal to ?
[CDS 2019(I)]
(a) 15 cm (b) 20 cm
(c) $20\sqrt{3}$ cm (d) $30\sqrt{3}$ cm

212. Three parallel lines x, y and z are cut by two transversals m and n. Transversal m cuts the lines x, y, z at P, Q, R respectively and transversal n cut the line x, y, z at L, M, N respectively, if PQ = 3cm, QR = 9cm and MN = 10.5, then what is the length of LM?
[CDS 2019(II)]
(a) 3 cm (b) 3.5 cm
(c) 4 cm (d) 4.5 cm

213. Which one of the following is correct in respect of a right angled triangle?
[CDS 2019(II)]
(a) Its orthocenter lies inside the triangle.
(b) Its orthocenter lies outside the triangle
(c) Its orthocenter lies on the triangle
(d) It has no orthocenter

214. Let the bisector of the angle BAC of a triangle ABC meet BC in X. Which one of the following is correct?
[CDS 2019(II)]
(a) $AB < BX$
(b) $AB > BX$
(c) $AX = CX$
(d) None of the above

215. A line segment AB is the diameter of a circle with centre at O having radius 6.5 cm. Point P is in the plane of the circle such that $AP = x$ and $BP = y$. In which one of the following cases the point does not lie on the circle?
[CDS 2019(II)]
(a) x = 6.5 cm and y 6.5 cm
(b) x = 12 cm and y = 5cm
(c) x = 5 cm and y = 12 cm
(d) x = 0 and y = 13 cm

216. The perimeters of two similar triangles ABC and PQR are 75 cm and 50 cm respectively. If the length of one side of the triangle PQR is 20 cm, then what is the length of corresponding side of the triangle ABC?
[CDS 2019(II)]
(a) 25 cm (b) 30 cm
(c) 40 cm (d) 45 cm

217. Let PQRS be a parallelogram whose diagonals PR and QS intersect at O. If triangles QRS is an equilateral triangle having a side of length 10 cm, then what is the length of the diagonal PR?
[CDS 2019(II)]
(a) $5\sqrt{3}$ cm (b) $10\sqrt{3}$ cm
(c) $15\sqrt{3}$ cm (d) $20\sqrt{3}$ cm

218. If ℓ is the length of the median of an equilateral triangle, then what is its area?
[CDS 2019(II)]
(a) $\frac{\sqrt{3}l^2}{3}$ (b) $\frac{\sqrt{3}l^2}{2}$
(c) $\sqrt{3}l^2$ (d) $2l^2$

219. A piece of wire is in the form of a sector of a circle of radius 20 cm, subtending an angle 150° at the centre. If it is bent in the form of a circle, then what will be its radius?
(a) $\frac{19}{3}$cm (b) 7 cm
(c) 8 cm (d) None of the above
[CDS 2019(II)]

220. Suppose *P, Q* and *R* are the mid-points of sides of a triangle of area 128 cm². If a triangle *ABC* is drawn by joining the mid-points of sides of triangle *PQR*, then what is the area of triangle *ABC*?
(a) 4 cm² (b) 8 cm²
(c) 16 cm² (d) 32 cm²
[CDS 2019(II)]

221. Let two lines *p* and *q* be parallel, Consider two points *B* and *C* on the line p and two points *D* and *E* on the line *q*. The line through B and E intersects the line through B and E intersects the line though *C* and *D* at *A* in between the two lines *p* and *q*. If *AC* : *AD* = 4 : 9, then what is the ratio of area of triangle *ABC* to that of triangle *ADE* ?
(a) 2 : 3 (b) 4 : 9
(c) 16 : 81 (d) 1 : 2
[CDS 2019(II)]

222. ABC is a triangle right angled at B. If AB = 5cm and BC = 10cm, then what is the length of the perpendicular drawn from the vertex B to the hypotenuse?
(a) 4 cm (b) $2\sqrt{5}$ cm
(c) $\frac{4}{\sqrt{5}}$ cm (d) 8 cm
[CDS 2019(II)]

223. If the length of the hypotenuse of a right angled triangle is 10 cm, then what is the maximum area of such a right angled triangle?
(a) 100 cm² (b) 50 cm²
(c) 25 cm² (d) 10 cm²
[CDS 2019(II)]

224. A piece of wire of length 33 cm is bent into an arc of a circle of radius 14 cm. What is the angle subtended by the arc at the centre of the circle?
(a) 75° (b) 90°
(c) 135° (d) 150°
[CDS 2019(II)]

225. If one side of a right-angled triangle (with all sides' integers) is 15 cm, then what is the maximum perimeter of the triangle?
(a) 240 cm (b) 225 cm
(c) 113 cm (d) 112 cm
[CDS 2019(II)]

226. Consider a trapezium *ABCD*, in which *AB* is parallel to *CD* and *AD* is perpendicular to *CD* and *AD* is perpendicular to *AB*. If the trapezium has an in-circle which touches *AB* at *E* and *CD* at *F*, where *EB* = 25 cm and *FC* = 16 cm, then what is the diameter of the circle?
(a) 16 cm (b) 25 cm
(c) 36 cm (d) 40 cm
[CDS 2019(II)]

227. ABCD is a plate in the shape of a parallelogram. EF is the line parallel to DA and passing though the point of intersection O of the diagonals AC and BD. further, E lies on DC and F lies on AB. The triangular portion DOE is cut out from the plate ABCD. What is the ratio of area of remaining portion of the plate to the whole?
(a) 5/8 (b) 5/7
(c) 3/4 (d) 7/8
[CDS 2020(I)]

228. Two circles of radii 20 cm and 16cm intersect and the length of common chord is 24 cm. If d is the distance between their centres, then which one of the following is correct?
(a) d < 26 cm (b) 26 cm < d < 27cm
(c) 27 cm < d < 28 cm (d) d > 28 cm
[CDS 2020(I)]

229. In a circle of radius 5 cm, AB and AC are two chords such that AB = AC = 8 cm. What is the length of chord BC?
(a) 9 cm (b) 9·2 cm
(c) 9·6 cm (d) 9·8 cm
[CDS 2020(I)]

230. ABCD is a parallelogram where AC and BD are the diagonals. If $\angle BAD = 60^\circ, \angle ADB = 90^\circ$, then what is BD² equal to ?
(a) $\frac{3}{5}$ AB² (b) $\frac{3}{4}$ AB²
(c) $\frac{1}{2}$ AB² (d) $\frac{2}{3}$ AB²
[CDS 2020(I)]

231. A line through the vertex *A* of a parallelogram *ABCD* meets *DC* in *P* and *BC* produced in *Q*. If P is the mid-point of *DC* then which of the following is/are correct?
1. Area of Δ*PDA* is equal to that of Δ*PCQ*
2. Area of Δ*QAB* is equal to twice that of Δ*PCQ*

Select the correct answer using the code given below:
[CDS 2020(I)]
(a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

232. The lengths if sides if a triangle are $3x, 4\sqrt{y}, 5\sqrt[3]{z}$, where $3x < 4\sqrt{y}, 5\sqrt[3]{z}$. If one of the angles is 90°, then what are the minimum integral value of *x,y,z* respectively?
(a) 1, 2, 3 (b) 2, 3, 4
(c) 1, 1, 1 (d) 3, 4, 5
[CDS 2020(I)]

233. What is the maximum number of circum-circles that a triangle can have?
(a) 1 (b) 2
(c) 3 (d) Infinite

[CDS 2020(I)]

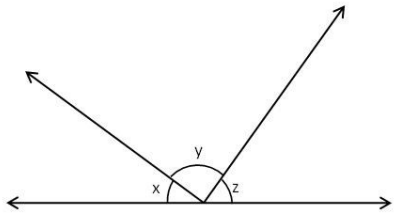
234. If an arc of a circle of radius 6 cm subtends a central angle measuring 30°, then which one of the following is an approximate length of the arc?
(a) 3·14 cm (b) 2·15 cm
(c) 2·14 cm (d) 2cm

[CDS 2020(I)]

235. A ladder 5 m long is placed in a room so as to reach a point 4·8m high on a wall and on turning the ladder over to the opposite side of the wall without moving the base it reaches a point 1·4 m high. What is the breadth of the room?
(a) 5·8 m (b) 6 m
(c) 6·2 m (d) 7·5 m

[CDS 2020(I)]

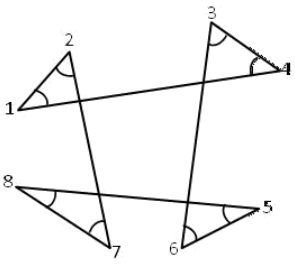
236. In the given figure, if $\frac{y}{x} = 6$ and $\frac{z}{x} = 5$, then what is the value of x?



(a) 45° (b) 30°
(c) 15° (d) 10°

[CDS 2020(I)]

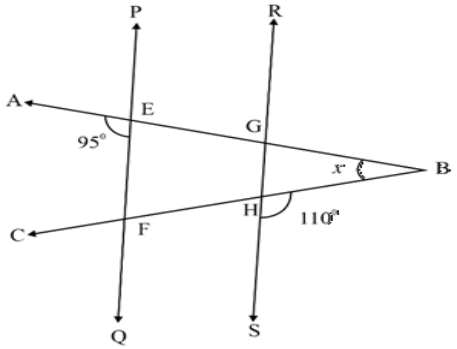
237. Angles are shown in the given figure. What is value of ∠1 + ∠2 + ∠3 + ∠4 + ∠5 +∠6 + ∠7 + ∠8?



(a) 240° (b) 360°
(c) 540° (d) 720°

[CDS 2020(I)]

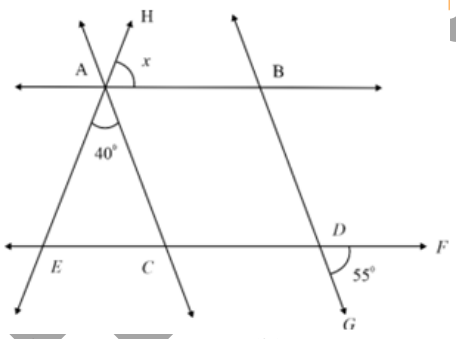
238. In the given figure PQ is parallel to RS, $\angle AEF = 95^\circ$, $\angle BHS = 110^\circ$, and $\angle ABC = x^\circ$. Then what is the value of x?



(a) 15 (b) 25
(c) 30 (d) 35

[CDS 2020(I)]

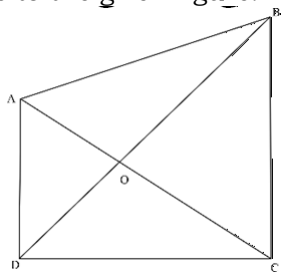
239. In the given figure AB is parallel to CD and AC is parallel to BD. If $\angle EAC = 40^\circ$, $\angle FDG = 55^\circ$, $\angle HAB = x^\circ$, then what is the value of x?



(a) 85 (b) 80
(c) 75 (d) 65

[CDS 2020(I)]

240. Consider the following statements with reference to the given figure:



1.The sun of the areas of ΔAOD and ΔBOC is equal to the sum of the areas of ΔAOB and ΔDOC.
2.∠AOD = ∠BOC
3.AB + BC + CD + DA > AC + BD
Which of the above statements are correct?

[CDS 2020(I)]

(a) 1 and 2 only (b) 2 and 3 only
(c) 1 and 3 only (d) 1, 2 and 3

241. A road curve is to be laid out on a circle. What radius should be used if the track is to change direction by 42° in distance of 44 m?
($Assume\ \pi = \frac{22}{7}$)

[CDS 2020(II)]

(a) 60 m (b) 66 m
(c) 75 m (d) 80 m

242. In a quadrilateral ABCD, $\angle B = 90^\circ$ and $AB^2 + BC^2 + CD^2 - AD^2 = 0$, then what is ∠ACD

[CDS 2020(II)]

(a) 30° (b) 60°
(c) 90° (d) 120°

243. In a ΔABC, AC = 12cm, AB = 16cm and AD is the bisector of ∠A. If BD = 4cm, then what is DC equal to?
[CDS 2020(II)]
(a) 2 cm (b) 3cm
(c) 4 cm (d) 5 cm

244. ABCD is a cyclic quadrilateral. The bisectors of the angles A, B, C and D cut the circle at P, Q, R and S respectively. What is $\angle PQR + \angle RSP$ equal to?
[CDS 2020(II)]
(a) 90° (b) 135°
(c) 180° (d) 270°

245. ABC is an equilateral triangle. The side BC is trisected at D such that BC = 3 BD. What is the ratio of AD^2 to AB^2 ?
[CDS 2020(II)]
(a) 7 : 9 (b) 1 : 3
(c) 5 : 7 (d) 1 : 2

246. Consider the following statements:
1. The diagonals of a trapezium divide each other proportionally.
2. Any line drawn parallel to the parallel sides of a t trapezium divides the non-parallel sides proportionally.
Which of the above statements are correct.
[CDS 2020(II)]
(a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

247. What is the area of right-angled triangle, if the radius of the circum-circle is 5 cm and altitude drawn to the hypotenuse is 4 cm?
[CDS 2020(II)]
(a) 20 cm^2 (b) 18 cm^2
(c) 16 cm^2 (d) 10 cm^2

248. In a triangle, values of all the angles are integers (I degree measure). Which one of the following cannot be the proportion of their measures?
[CDS 2020(II)]
(a) 1 : 2 : 3 (b) 3 : 4 : 5
(c) 5 : 6 : 7 (d) 6 : 7 : 8

249. If the sum of all interior angles of a regular polygon is twice the sum of all its exterior angles, then the polygon is
[CDS 2020(II)]
(a) Hexagon (b) Octagon
(c) Nonagon (d) Decagon

250. A bicycle wheel makes 5000 revolutions in moving 11 km. What is the radius of the wheel? (Assume $\pi = \frac{22}{7}$)
[CDS 2020(II)]
(a) 17.5 cm (b) 35 cm
(c) 70 cm (d) 140 cm

251. In a triangles ABC, if 2 ∠ A = 3 ∠ B = 6 ∠ C, then what is ∠ A + ∠ C equal to?
[CDS 2020(II)]
(a) 90° (b) 120°
(c) 135° (d) 150°

252. The lengths of the sides of a right-angled triangle are consecutive even integers (in cm). What is the product of these integers?
[CDS 2020(II)]
(a) 60 (b) 120
(c) 360 (d) 480

253. A circle is inscribed in a triangle ABC. It touches the sides AB and AC at M and N respectively. If O is the centre of the circle and $\angle A = 70^\circ$, then what is ∠MON equal to ?
[CDS 2020(II)]
(a) 90° (b) 100°
(c) 110° (d) 120°

254. A triangle and parallelogram have equal areas and equal bases. If the altitude of the triangle is k times the altitude of the parallelogram, what is the value of k?
[CDS 2020(II)]
(a) 4 (b) 2
(c) 1 (d) $\frac{1}{2}$

255. AD is the median of the triangle ABC. If P is any point on AD, then which one of the following is correct?
[CDS 2020(II)]
(a)Area of triangle PAB is greater than the area of triangle PAC
(b)Area of triangle PAB is equal to area of triangle PAC
(c)Area of triangle PAB is one-fourth of the area of triangle PAC
(d)Area of triangle PAB is half of the area of triangle PAC

256. What is the area of a segment of a circle of radius r subtending and angle θ at the centre?
[CDS 2020(II)]

(a) $\frac{1}{2}r^2\theta$ (b) $\frac{1}{2}r^2\left(\theta - 2\sin\frac{\theta}{2}\cos\frac{\theta}{2}\right)$
(c) $\frac{1}{2}r^2\left(\theta - \sin\frac{\theta}{2}\cos\frac{\theta}{2}\right)$ (d) $\frac{1}{2}r^2\sin\frac{\theta}{2}\cos\frac{\theta}{2}$

257. ABC is a triangle right-angled at C. Let P be any point on AC and Q be any point BC. Which of the following statements is/are correct?
1. $AQ^2 + BP^2 = AB^2 + PQ^2$
2. AB = 2PQ
Select the correct answer using the code given below:
[CDS 2020(II)]
(a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

258. The sum of the squares of sides of a right-angled triangle is 8,450 square units. What is the length of its hypotenuse?
[CDS 2020(II)]
(a) 50 units (b) 55 units
(c) 60 units (d) 65 units

259. In a trapezium ABCD, AB is parallel to DC. The diagonals AC and BD intersect at P. If AP : PC = 4; (4x-4) ad BP : PD = (2x −1) : (2x + 4), then what is the value of x ?
[CDS 2021(I)]
(a) 4 (b) 3
(c) $\frac{3}{2}$ (d) 2

260. ΔABC is similar to ΔDEF. The perimeters of ΔABC and ΔDEF are 40 cm and 30 cm respectively. What is the ratio of (BC + CA) to (EF + FD) equal to?
[CDS 2021(I)]
(a) 5 : 4 (b) 4 : 3
(c) 3 : 2 (d) 2 : 1

261. Two isosceles triangles have equals vertical angle and their areas are in the ration 4.84:5.29. What is the ratio of their corresponding heights?
[CDS 2021(I)]
(a) 11 : 23 (b) 23 : 25
(c) 22 : 23 (d) 484 : 529

262. ABC is a triangle right angled at A and AD is perpendicular BC. If BD = 8 cm and DC = 12.5 cm, then what is AD equal to?
[CDS 2021(I)]
(a) 7.5 cm (b) 8.5 cm
(c) 9 cm (d) 10 cm

263. The sides of a right-angled triangle are in the ratio $x:(x-1):(x-18)$. What is the perimeter f the triangle?
[CDS 2021(I)]
(a) 28 units (b) 42 units
(c) 56 units (d) 84 units

264. ABC is a triangle right angled at B. Let M and N be two points on AB such that AM = MN = NB. Let P and Q be two points on AC such that PM is parallel to QN and QN is parallel to CB. If BC = 12 cm, then what is (PM + QN) equal to?
(a) 10 cm (b) 11 cm
(c) 12 cm (d) 13 cm
[CDS 2021(I)]

265. AB and CD are the diameters of a circle which intersect at P. Join AC, CB, BD, and DA. If $\angle PAD = 60^\circ$, then what is ∠BPD equal to?
(a) 30° (b) 60°
(c) 90° (d) 120°
[CDS 2021(I)]

266. An equilateral triangle ABC and a scalene triangle DBC are inscribed in a circle on same side of the arc. What is ∠ BDC, equal to?
(a) 30° (b) 45°
(c) 60° (d) 90°
[CDS 2021(I)]

267. The sides of a triangle ABC are 4 cm, 6 cm and 8 cm. With the vertices of the triangles as centres, three circles are drawn each touching the other two externally. What is the sum of the radii of the three circles?
(a) 6 cm (b) 7 cm
(c) 9 cm (d) 10 cm
[CDS 2021(I)]

268. Let PAB be a secant to a circle intersecting the circle at A and B. Let PT be the tangent segment. If PA = 9 cm and PT = 12 cm, then what is AB equal to?
(a) 5 cm (b) 6 cm
(c) 7 cm (d) 9 cm
[CDS 2021(I)]

269. If the perimeter of a right-angled triangle is 30 cm and the hypotenuse is 13 cm then what is the area of the triangle?
(a) 24 cm^2 (b) 27 cm^2
(c) 30 cm^2 (d) 36 cm^2
[CDS 2021(I)]

270. ABC is a triangle right angled at C. Let p be the length of the perpendicular drawn from C on AB. If BC = 6cm and CA = 8 cm, then what is the value of P?
[CDS 2021(I)]
(a) 5.4 cm (b) 5 cm

(c) 4.8 cm (d) 4.2

271. ABCD is a trapezium in which AB is parallel to DC and 2AB = 3DC. The diagonals AC and BD intersect at O. What is the ratio of the area of ΔAOB to that of ΔDOC?

[CDS 2021(I)]

(a) 2 : 1 (b) 3 : 2
(c) 4 : 1 (d) 9 : 4

272. A circle touches all the four sides of a quadrilateral ABCD. If AB = 9 cm, BC = 8 cm and CD = 12, then what is DA equal to?

(a) 14 cm (b) 13 cm
(c) 12 cm (d) 11 cm

[CDS 2021(I)]

Consider the following for the next three (03) items that follows:

ABC is a triangle with sides AB = 6 cm, BC = 10 cm and CA = 8 cm. What vertices A, B and C as centres, three circles are drawn each touching the other two externally.

[CDS 2021(II)]

273. What is the sum of the radii of the circles?

(a)10.4cm (b) 11.2cm
(c) 12cm (d) 13cm

274. What is the length of the altitude of the triangle drawn from vertex A on BC?

(a) 2.4cm (b) 3cm
(c) 4cm (d) 4.8cm

275. If P, Q and R are the areas of sectors at A, B and C within the triangle respectively, then which of the following is/are correct?

1.P = π cm^2
2.9Q + 4R = 36π cm^2

Select the correct answer using the code given below:

(a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

Consider the following for the next two (02) items that follow:

ABC is triangle in which AB = AC and D is any point on BC.

[CDS 2021(II)]

276. Which one of the following is correct?

(a) $AB^2 - AD^2 = AD \times BD$
(b) $AC^2 - AD^2 = BD \times CD$
(c) $AB^2 - AD^2 = 2\ AD \times BD$
(d) $AC^2 - AD^2 = 2\ BD \times CD$

277. If AD = 5 cm, BD = 4 cm and CD = 6 cm, then what is AB equal to?

(a) 7cm (b) 6.5cm
(c) 6cm (d) 5.5cm

Consider the following for the next three (03) items that follow:

ABC is a triangle with AB = 1.6cm, BC = 6.3 cm and CA = 6.5 cm. Let P and Q be the mid points of AB and BC respectively.

[CDS 2021(II)]

278. What is $AB^2 + 4BQ^2$ equal to?

(a) 41.25cm^2 (b) 42.25cm^2
(c) 43.75cm^2 (d) 44.25cm^2

279. What is $AQ^2 + CP^2$ equal to?

(a) AC^2 (b) 1.2 AC^2
(c) 1.25 AC^2 (d) 1.5 AC^2

280. What is $4(CP^2 - AQ^2)$ equal to?

(a)101.39 cm^2 (b) 111.39 cm^2
(c) 121.39 cm^2 (d) 131.39 cm^2

Consider the following for the next two (02) items that follow:

AB is a diameter of a circle with centre O. Radius OP is perpendicular to AB. Let Q be any point on are PB.

[CDS 2021(II)]

281. What is ∠BAP equal to?

(a) 30° (b) 40°
(c) 45° (d) 60°

282. What is ∠AQP equal to?

(a) 30° (b) 40°
(c) 45° (d) 60°

283. In a triangle ABC, AB = 16cm, AC = 12 cm and AD is the bisector of ∠A. If BD = 4, then what is CD equal to?

[CDS 2022(I)]

(a) 2cm (b) 2.5cm
(c) 3cm (d) 3.5cm

284. An equilateral triangle of side x is inscribed in a circle of radius y. Which one of the following is correct?

(a) 2y = x (b) $2y = \sqrt{3}x$
(c) $\sqrt{3}y = 2x$ (d) $\sqrt{3}y = x$

[CDS 2022(I)]

285. ABC is a triangle right angled at B. Let D be the midpoint on AC. If BD = 6.5cm, then what is $AB^2 + BC^2$ equal to?

(a) 144 square cm (b) 169 square cm
(c) 196 square cm (d) 225 square cm

[CDS 2022(I)]

286. In a right triangle ABC, BD is perpendicular on hypotenuse AC. If AC = 9 cm and AD = 4 cm, then what is AB + BC approximately equal to?

(a) 12cm (b) 12.2cm
(c) 12.4cm (d) 12.6cm

[CDS 2022(I)]

287. In a triangle ABC, AD is the bisector of ∠BAC. If AB = 12 cm, BD = 10 cm and DC = 5cm, then what is the perimeter of the triangle?
(a) 30cm (b) 31cm
(c) 33cm (d) 35cm

[CDS 2022(I)]

288. What is the radius of the circle inscribed in a triangle whose sides are 4 cm, 7.5cm and 8.5cm?

[CDS 2022(I)]

(a) 1.5cm (b) 2cm
(c) 2.5cn (d) 3cm

289. An equilateral triangular sheet is formed by joining 9 equilateral triangular sheets each of area $9\sqrt{3}cm^2$. What is the height of the bigger triangular sheet?
(a) $9\sqrt{3}$ cm (b) 18cm
(c) $18\sqrt{3}$cm (d) 27cm

[CDS 2022(I)]

290. ABCD is a trapezium in which AB is parallel to DC. Let E and F be the midpoints on AD and BC respectively. If EF=10 cm and AB–DC =4cm, then what is the value of AB × DC?
(a) 84 square cm (b) 96 square cm
(c) 100 square cm (d) 108 square cm

291. ABCD is a parallelogram with AB = 15cm and AD = 8cm. If θ is the acute angle between AB and AD, then what is the area of the parallelogram in square cm?
(a) 60 sinθ (b) 120 sinθ
(c) 60 cosθ (d) 120 cosθ

[CDS 2022(I)]

292. The diagonal of a square is $12\sqrt{2}$ cm and the area of an equilateral triangle is $64\sqrt{3}$ square cm. Which of the following statements is/are correct?
1. The square and the triangle have the same perimeter.
2. Four times the area of the square is equal to $3\sqrt{3}$ times the area of the triangle.

Select the correct answer using the code given below:
(a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

[CDS 2022(I)]

293. Consider the following statements:
1. The sum of any two sides of a triangle is less than twice the median drawn to the third side.
2. The perimeter of a triangle is greater than the sum of the three medians.

Which of the above statements is/are correct?
(a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

[CDS 2022(I)]

294. Let D, E and F be the midpoints of the sides BC, CA and AB respectively of a triangle ABC. Triangle DEF is congruent to which of the following triangles?
1. AEF
2. FBD
3. EDC

Select the correct answer using the code given below:
(a)1 only (b) 2 and 3 only
(c) 3 only (d) 1, 2 and 3

[CDS 2022(I)]

295. In a triangle ABC, AB = AC and BC is produced to D such that ∠ACD = x, then what is ∠BAC equal to?
(a) 2x–90° (b) 2x–180°
(c) 180°–2x (d) $\frac{x}{2}$

[CDS 2022(I)]

296. ABC is a triangle right angled at B with AC = 2BC. If ∠A = x, then what is ∠ C equal to?
(a) $\frac{x}{2}$ (b) 2x
(c) $\sqrt{2}x$ (d) $\sqrt{3}x$

[CDS 2022(I)]

297. Consider the following statements:
1. If two chords AB and AC of a circle are equal, then the centre of the circle lies on the angle bisector of angle CAB.
2. If two concentric circles are intersected by a line at A, B, C and D respectively, then AC = BD.

Which of the above statements is/are correct?
(a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

[CDS 2022(I)]

298. A circle of radius 25cm has a chord of length 48 cm. What is the length of the perpendicular drawn from the centre of the circle to the chord?
(a) 5cm (b) 5.5cm
(c) 6.5cm (d) 7cm

[CDS 2022(I)]

299. The perpendicular dropped from a vertex of a right-angled triangle upon the hypotenuse divides it into two segments of lengths 9 units and 16 units respectively. What is the length of the perpendicular?
(a) 6 units (b) 8 units

(c) 10 units (d) 12 units

[CDS 2022(I)]

300. What is the ratio of interior angle to exterior angle of a regular polygon of n sides?

(a) n (b) $\frac{n-1}{2}$

(c) $\frac{n-2}{2}$ (d) $\frac{2(n-2)}{3}$

[CDS 2022(I)]

Consider the following for the next three (03) items that follow:

A triangle ABC with sides AB = 15cm, BC = 9cm, CA = 12cm is inscribed in a circle.

[CDS 2022 (II)]

301. What is $\cos^2A + \cos^2B + \cos^2C$ equal to?

(a) 3/4 (b) 1

(c) 5/4 (d) 2

302. What is $\sin^2A + \sin^2B + \sin^2C$ equal to?

(a) 2 (b) 5/4

(c) 1 (d) 3/4

303. What is the radius of the circle?

(a) 4.5 cm (b) 6 cm

(c) 7.5 cm (d) 15 cm

304. ABCD is a parallelogram. A circle through A, B and C intersects CD (produced) at E. Which of the following is/are correct?

1. AE = AD
2. CD = DE

Select the correct answer using the code given below:

(a) only 1 (b) only 2

(c) both 1 and 2 (d) neither 1 nor 2

[CDS 2022 (II)]

305. Consider the following statements:

1. In an equilateral triangle, the centroid and centre of circumcircle coincide
2. Angle bisectors of a cyclic quadrilateral from another cyclic quadrilateral
3. Every cyclic parallelogram is a rectangle

Which of the statements given above are correct.

(a) only 1 and 2 (b) only 2 and 3

(c) only 1 and 3 (d) 1, 2 and 3

[CDS 2022 (II)]

306. ABCD is a trapezium in which AB is parallel to DC. The vertices A, B, C and D pass through a circle. Which of the following are correct?

1. AD = BC
2. $\angle A + \angle C = 180°$
3. $\angle A + \angle D = 180°$

Select the correct answer using the code given below:

(a) only 1 and 2 (b) only 2 and 3

(c) only 1 and 3 (d) 1, 2 and 3

[CDS 2022 (II)]

307. ABCD is a cyclic quadrilateral. AB and DC when produced, meet in E. Which of the following statements is/are correct?

1. ΔEBC is similar to ΔEAD
2. $\angle CBE + \angle DAE = 180°$.

Select the correct answer using the code given below:

(a) only 1 (b) only 2

(c) both 1 and 2 (d) neither 1 nor 2

[CDS 2022 (II)]

308. In a triangle ABC, DE is a line segment which intersects AB at D and AC at E such that DE is parallel to BC. The line segment divides the triangle in two parts of equal area. What is $\frac{BD}{AB}$ equal to?

(a) $\frac{\sqrt{2}-1}{2}$ (b) $\frac{\sqrt{2}-1}{\sqrt{2}}$

(c) $\frac{\sqrt{3}-1}{\sqrt{3}}$ (d) $\sqrt{2}$

[CDS 2022 (II)]

309. A right angled triangle ABC is inscribed in a circle of radius 10cm. The altitude drawn to the hypotenuse AC is of length 8cm. If AB = x cm and BC = y cm, then what is the value of xy?

(a) 60 (b) 80

(c) 120 (d) 160

[CDS 2022 (II)]

310. A circle is inscribed in a triangle ABC. It touches the sides BC, CA, AB at D, E, F respectively. What is $\angle EDF$ equal to?

(a) 90°–A (b) $90° - \frac{(B+C)}{2}$

(c) 90° – 2A (d) $90° - \left(\frac{A}{2}\right)$

[CDS 2022 (II)]

311. Triangle ABC is right-angled at A and AD is perpendicular to BC. If BD = 7.5 cm and DC = 10 cm, then what is AD equal to?

(a) 5cm (b) $5\sqrt{2}cm$

(c) $5\sqrt{3}cm$ (d) 10cm

[CDS 2022 (II)]

312. The perpendicular AD on the base BC of a triangle ABC intersects BC at D so that DB = 3CD. Which one of the following is correct?

(a) $2\,(AB+AC)\,(AB-AC) = BC^2$

(c) $3\,(AB+AC)\,(AB-AC) = 2BC^2$

(c) $4\,(AB+AC)\,(AB-AC) = 3BC^2$

(d) $5\,(AB+AC)\,(AB-AC) = 4BC^2$

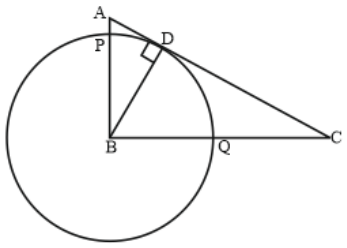
[CDS 2022 (II)]

313. Triangle ABC is right-angled at C and AC = $\sqrt{3}$BC. What is ∠ABC equal to?
(a) 30° (b) 45°
(c) 60° (d) 75°

[CDS 2022 (II)]

Consider the following for the next three (03) items that follow:
In the triangle ABC, AB = 6cm, BC = 8 cm and AC = 10cm. The perpendicular dropped from B meets the side AC at D. A circle of radius BD (with centre B) cuts AB and BC at P and Q respectively as shown in the figure.

[CDS – 2023 (1)]



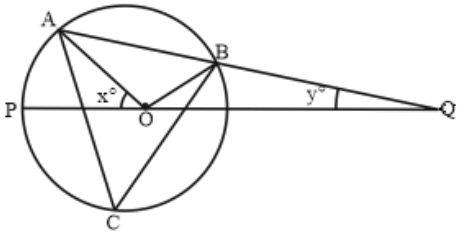
314. What is the length of QC?
(a) 4.4cm (b) 4.2cm
(c) 3.6cm (d) 3.2cm

315. If ∠ABD = θ, then what is sin θ equal to?
(a) 0.4 (b 0.5
(c) 0.6 (d) 0.8

316. What is the radius of the circle?
(a) 5cm (b) 4.8cm
(c) 4.4cm (d) 4cm

Consider the following for the next two (02) items that follows:
In the following figure, a triangle ABC is inscribed in a circle with centre at O. Let ∠ POA = x° and ∠OQB = y°. Further OB = BQ.

[CDS – 2023 (1)]



317. What is the relation between x and y?
(a) x=y (b) 2x=3y
(c) x=3y (d) 3x=4y

318. If y = 15, then what is ∠ACB equal to?
(a) 30° (b) 40°
(c) 45° (d) 60°

319. ABCD is a square field with AB = x. A vertical pole OP of height 2x stands at the centre O of the square field. If ∠ APO = θ, then what is cot θ equal to?
(a) $\sqrt{2}$ (b) 2
(c) $2\sqrt{2}$ (d) $3\sqrt{2}$

[CDS – 2023 (1)]

320. Let ABC be a right-angled triangle with sides 5cm, 12cm and 13cm. If p is the length of the perpendicular drawn from vertex A on the hypotenuse BC, then what is the value of 13p?
(a) 24 (b) 48
(c) 60 (d) 90

[CDS – 2023 (1)]

For the next ten (3) items that follows:
Each item contains a question followed by two Statement. Answer each item using the following instructions:
(a)choose this option if the question can be answered by one of the statements alone but not by the other.
(b)choose this option if the question can be answered by either statement alone.
(c)Choose this option if the question can be answered by using both the statements together, but cannot be answered by using either statement alone
(d)Choose this option if the question cannot be answered even by using both statements together.

[CDS – 2023 (1)]

321. Question : Can a circle be drawn through the points A, B and C?
Statement I: AB = 5cm, BC = 5cm, CA = 6cm
Statement II: AB = 3cm, BC = 4cm, CA = 7cm.

322. Question: Is triangle Δ right angled?
Statement I: The length of the line segment joining the mid-points of two sides of Δ is half of the third side of Δ.
Statement II: The angles of Δ are in the ratio 1:2:3.

323. The lengths of two longer sides of the triangle Δ are 25 cm and 24cm.
Question: What is the length of the shortest side?
Statement I: The angles of Δ are in the ratio 1:2:3
Statement II: The length of the perpendicular drawn on the longest side of Δ from its opposite vertex is 6.72cm.

324. The arch of a bridge is in the form of an arc of a circle. If the span of the bridge is 40m and height in the middle is 8m, then what is the radius of curvature of the bridge?

[CDS-2023 (2)]

(a) 25m (b) 27m
(c) 29m (d) 31m

325. If a, b and c are the sides of a right-angled triangle, where a > b > c, then what is the value of the expression.
(a + b + c) (a + b – c) (a – b + c)(a – b – c) ?
(a) $4b^2c^2$ (b) $-4b^2c^2$
(c) $-2a^2b^2$ (d) $-4a^2b^2$

[CDS-2023 (2)]

326. Consider the following statements:
1.The angle in a sector greater than a semi-circle is less than a right angle
2.If two sides of a pair of opposite sides of a cyclic quadrilateral are equal, then its diagonals are also equal.
Which of the statements given above is/are correct ?
(a) 1 only (b) 2 only
(c) both 1 and 2 (d) neither 1 nor 2

[CDS-2023 (2)]

327. In a triangle ABC, angle B = 90° and p is the length of the perpendicular from B to AC. If BC = 10cm and AC = 12cm, then what is the value of p?

(a) $\frac{5\sqrt{11}}{3}$ (b) $\frac{10\sqrt{11}}{3}$

(c) $\frac{40}{\sqrt{61}}$ (d) $\frac{12}{25}$

[CDS-2023 (2)]

328. A triangle has sides 13cm, 14cm and 15cm long. What is the length of the smallest altitude of the triangle?
(a) 11cm (b) 11.2cm
(c) 12cm (d) 12.2cm

[CDS-2023 (2)]

329. Thy hypotenuse AC of a right-angled ABC $3\sqrt{5}$cm. If AB is doubled and BC is tripled such that ABC remains a right-angle triangle, the hypotenuse becomes 15cm. What is AB + BC equal to?

[CDS-2023 (2)]

(a) 10cm (b) 9cm
(c) $2\sqrt{5}$cm (d) 8cm

Consider the following for the next two (02) items that follow:
Two parallel chords AB and CD of a circle are of lengths 60 cm and 80cm respectively. They are on the same side of the centre O and 10cm apart.

[CDS-2023 (2)]

330. What is the diameter of the circle?
(a) 120cm (b) 110cm
(c) 100cm (d) 90cm

331. If the chord AB subtends an angle α and chord CD subtends as angle β at the centre O, then what is the value of

$\tan\left(\frac{\beta}{2}\right) - \tan\left(\frac{\alpha}{2}\right)$?

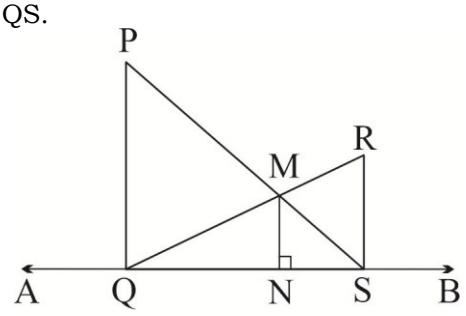
(a) 3/4 (b) 5/12
(c) 1/2 (d) 7/12

332. Consider the following for the next question.
Mark option (a) if the question can be answered by using one of the statements alone, but cannot be answered using the other statement alone.
Mark option (b) if the question can be answered by using either statements alone.
Mark option (c) if the question canbe answered by using both the statements together, but cannot be answered using either statement alone.
Mark option (d) if the question cannot be answered even by using both the statements together.

[CDS-2023 (2)]

Question: What is the area of the triangle inscribed in a semi circle with the diameter as the base?
Statement I:
The diameter of semi circle is 20 cm
Statement II:
Two shorter sides of the triangle are 12 cm and 16 cm

Consider the following for the next two (02) items that follow:
Let two parallel line segments PQ = 5 cm and RS = 3 cm be perpendicular to a horizontal line AB, as shown in the figure given below. The point of intersection of PS and QR is M and MN is perpendicular to QS.



[CDS-2024 (1)]

333. What is the length of MN?

(a) $\frac{3}{8}$cm (b) $\frac{5}{8}$cm

(c) $\frac{9}{8}$cm (d) $\frac{15}{8}$cm

334. What is the ratio of the area of the quadrilateral PQNM to the area of the quadrilateral RSNM?

(a) $\frac{200}{117}$ (b) $\frac{212}{117}$

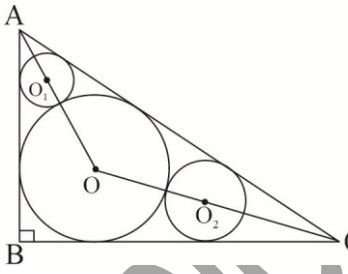
(c) $\frac{275}{117}$ (d) $\frac{250}{117}$

Consider the following for the next three (03) items that follow:

ABC is a right-angled triangle with ∠ABC = 90°. The centre of the incircle of the given triangle is at O, whose radius is 2 cm. Two more circles with centres at O_1 and O_2, touch this circle and the two sides of shown in the figure given below.

Further MA : MC = 2 : 3.

[CDS-2024 (1)]



335. What is AB + BC equal to?

(a) 10 cm (b) 12 cm

(c) 13 cm (d) 14 cm

336. What is the radius of the circle with centre at O_1?

(a) $4-\sqrt{5}$ (b) $1+\sqrt{5}$

(c) $2+\sqrt{5}$ (d) $3-\sqrt{5}$

337. What is the radius of the circle with centre at O_2?

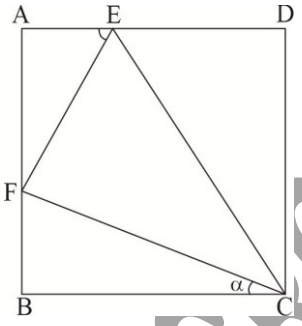
(a) $5-\sqrt{10}$ (b) $1+2\sqrt{5}$

(c) $\frac{22-4\sqrt{10}}{9}$ (d) $\frac{22-2\sqrt{10}}{9}$

Consider the following for the next two (02) items that follow:

A triangle CEF is drawn inside a square ABCD as shown in the figure given below. Given: CF = 8 cm, EF = 6 cm and CE = 10 cm.

[CDS-2024 (1)]



338. What is the area of the square ?

(a) $\frac{512}{17}$ square cm (b) $\frac{625}{13}$ square cm

(c) $\frac{1024}{17}$ square cm (d) $\frac{1296}{13}$ square cm

339. What is tan α + tan β equal to

(a) $\frac{13}{16}$ (b) $\frac{15}{16}$

(c) $\frac{17}{16}$ (d) $\frac{17}{4}$

340. What is the are of triangle CDE?

(a) $\frac{416}{17}$ square cm (b) $\frac{312}{13}$ square cm

(c) $\frac{208}{17}$ square cm (d) $\frac{156}{13}$ square cm

Consider the following for the next four items that follow:

Each item contains a Question followed by two Statements. Answer each item using the following instructions:

Choose option

(a) If the Question can be answered by one of the Statements alone, but not by the other.

(b) If the Question can be answered by either Statement alone

(c) If the Question can be answered by using both the Statements together, but cannot be answered by using either Statement alone.

(d) If the Question cannot be answered even by using both Statements together

[CDS-2024 (1)]

341. A circle touches all the four sides AB, BC, CD, DA of a quadrilateral ABCD

Question: What is the perimeter of the quadrilateral?

Statement-I: AB + DC = 10 cm
Statement-II: AD + BC = 10 cm

342. Question: what is the ratio of the lengths of diagonals of a rhombus?
Statement-I: One diagonal of the rhombus is equal to its side
Statement-II: The longer diagonal of the rhombus is equal to $\sqrt{3}$ times its side

343. The chord of a circle of radius R touches at a point on the circumference of a concentric circle of radius r. The length of the chord is 24 units.
Question: What are the values of r and R?
Statement-I: r is an integer
Statement-II: R is an integer.

344. P, Q, R, S are the mid-points of sides AB, BCV, CD, DA respectively of a quadrilateral ABCD.
Question: What is the difference in the area of the quadrilateral ABCD and the area of the quadrilateral PQRS?
Statement-I: Area of the quadrilateral ABCD is 100 square unit.
Statement-II: Area of the quadrilateral PQRS is 50 square unit.

345. In a quadrilateral ABCD, AB = 6m, BC = 18 cm, CD = 6 cm and DA = 10 cm. If the diagonal BD = x, then which one of the following is correct?
(a) $8 < x < 12$ (b) $12 < x < 16$
(c) $16 < x < 18$ (d) $18 < x < 20$
[CDS-2024 (1)]

346. In a quarter circle of radius R, a circle of radius r is inscribed. What is the ratio of R to r?
(a) $(\sqrt{2}+1):1$ (b) $(\sqrt{3}+1):1$
(c) 3 : 2 (d) 5 : 4
[CDS-2024 (1)]

347. In a quadrilateral ABCD, AB = BC and CD = DA; AC and BD are diagonals such that AC = 6 cm and BD = 12 cm. What is the area of the quadrilateral?
(a) 24 square cm (b) 30 square cm
(c) 36 square cm (d) 40 square cm
[CDS-2024 (1)]

348. If the difference between the interior and exterior angles of a regular polygon is 144°, then what is the number of sides of the polygon?
(a) 12 (b) 16
(c) 18 (d) 20
[CDS-2024 (1)]

349. In a triangle ABC, D is a point on BC. If AB.DC = AC.BD, $\angle BAD = \alpha$ and $\angle CAD = \beta$ then which of the following is correct ?
(a) $\alpha = \beta$ (b) $\alpha = 2\beta$
(c) $2\alpha = \beta$ (d) $2\alpha = 3\beta$
[CDS-2024 (2)]

350. If p, q, r are the lengths (in cm) of the sides of a right – angled triangle, then
(p – q – r) (q – r – p) (r – p – q) is always
(a) positive only
(b) negative only
(c) non positive only
(d) non negative only
[CDS-2024 (2)]

351. Two towers A and B of height 23 m and 11 m respectively, stand 9 m apart. A straight rod is joined to the two tops of the towers. A monkey sitting on the top of A, climbs the rod to reach the top of B. If the monkey takes 5 minutes to reach the other end, what is the average speed of the monkey ?
(a) 10 m/min (b) 5 m/min
(c) 10 cm/sec (d) 5 cm/sec
[CDS-2024 (2)]

Consider the following for the next three items that follow:
Let ABC be a triangle right angled at B. Let P be the point on BC such that BP = PC. If AB = 10 cm, $\angle BAP = 45°$ and $\angle CAP = \theta$
Use $\tan(\alpha+\beta)=\dfrac{\tan\alpha+\tan\beta}{1-\tan\alpha\tan\beta}$
[CDS-2024 (2)]

352. What is $\tan\theta$ equals to ?
(a) 1/2 (b) 1/3
(c) 1/4 (d) 1/5

353. If $\angle ACP = \gamma$, then what is $\tan\gamma$ equal to ?
(a) 1/2 (b) 1/3
(c) 2/3 (d) 1

354. Consider the following statements
I. the line segment AP divides the area of the triangle ABC into two equal parts
II. the perimeter of the triangle ABC is more than 46 cm
III. the area of the triangle APC is 50 square cm
which of the statements given above are correct
(a) I and II only (b) II and III only
(c) I and III only (d) I, II and III

Consider the following for the next two items that follow:
ABC is a triangle right angled at B. Given that AC – AB = 2 cm and BC = 16 cm

[CDS-2024 (2)]

355. If ∠BAC = θ that what is sinθ + cosθ equal to ?
(a) 1 (b) 71/65
(c) 73/65 (d) 79/65

356. If BD is perpendicular on the side AC, then what is the length of BD ?
(a) 1008/65 cm (b) 756/65 cm
(c) 168/7 cm (d) 165/7 cm

Consider the following for the next three items that follow:
Let MN be a chord of length 16 cm of a circle with centre at O and radius 10 cm. The tangents at M and N intersect at a point P. Further , OP intersects MN perpendicularly at Q.

[CDS-2024 (2)]

357. What is OQ equal to ?
(a) 5 cm (b) 6 cm
(c) 7 cm (d) 8 cm

358. What is PM equal to?
(a) 10 cm (b) 12 cm
(c) 40/3 cm (d) 50/3 cm

359. What is the area of the triangle OMN?
(a) 36 sq cm (b) 40 sq cm
(c) 45 sq cm (d) 48 sq cm

360. In a triangle ABC, AB = 21 cm, BC = 20 cm, and CA = 13 cm. A perpendicular CD is drawn upon the longest side. What is the area of the triangle BCD?
(a) 96 sq cm (b) 84 sq cm
(c) 80 sq cm (d) 72 sq cm

[CDS-2024 (2)]

361. A circle is inscribed in a triangle ABC right-angled at B. if AB = 5 cm and BC = 12 cm, then what is the radius of the circle?
(a) 1 cm (b) 1.5 cm
(c) 2 cm (d) 2.5 cm

[CDS-2024 (2)]

362. The ratio of sum of interior angles to sum of exterior angles of a regular polygon of n sides is 7/2 . What is the measure of an interior angle of polygon ?
(a) 110° (b) 120°
(c) 130° (d) 140°

[CDS-2024 (2)]

363. In a right angled triangle ABC, ∠A = 90° and AD is perpendicular to BC. If ∠CAD = 60° and BC = 6cm, ten what is AB equal to ?
(a) 3 cm (b) 4 cm
(c) 5 cm (d) 6 cm

[CDS-2024 (2)]

Consider the following for the next two items that follow:
ABC is a triangle right-angled at A. Further, AB = 8 cm, BC = 10 cm. D is the point on BC such that AD is perpendicular to BC?

364. What is AD equal to?
(a) 4.8 cm (b) 5.0 cm
(c) 5.2 cm (d) 5.4 cm

[CDS-2025 (1)]

365. What is ratio of area of triangle ADC to area of triangle ADB?
(a) 7 : 15 (b) 9 : 16
(c) 2 : 3 (d) 3 : 4

[CDS-2025 (1)]

Consider the following for the next two items that follow:
ABC is a triangle right-angled at B. The perimeter of the triangle is 24 cm and the difference between the sum of the perpendicular sides and the hypotenuse is 4 cm.

366. What is the area of the triangle ABC?
(a) 18 sq cm (b) 24 sq cm
(c) 36 sq cm (d) 48 sq cm

[CDS-2025 (1)]

367. A circle is inscribed in the triangle. What is its radius?
(a) 1 cm (b) 1.5 cm
(c) 2 cm (d) 2.5 cm

[CDS-2025 (1)]

Consider the following for the next two items that follow:
A circle M of radius 8 cm touches externally with another circle N of radius 16 cm. Let P, Q be the points where common tangent touches the circles M and N respectively.

368. What is the length of the common tangent PQ?
(a) 16 cm (b) 16√2 cm
(c) 24 cm (d) 24√2 cm

[CDS-2025 (1)]

369. If U, V are the centres of the circles M and N respectively, then what is the area of the quadrilateral formed by the points P, Q, V and U?
(a) 192√2 sq cm (b) 192 sq cm
(c) 96√2 sq cm (d) 96 sq cm

[CDS-2025 (1)]

370. C is the centre of circle of radius 20 cm. AB is a chord of length 32 cm. E is a point on AB such that CE = 13 cm. What is AE×EB equal to ?
(a) 231 sq cm (b) 256 sq cm

(c) 272 sq cm (d) 297 sq cm
[CDS-2025 (1)]

371. In a triangle ABC, AB = 2 cm, BC = 4 cm and AC = 3 cm. The bisector of angle A meets BC at D and the bisector of angle B meets AD at E. What is AE : ED equal to?
(a) 5 : 4 (b) 5 : 3
(c) 4 : 3 (d) 3 : 2
[CDS-2025 (1)]

372. In a triangle ABC, the bisector of angle A cuts BC at D. If AB + AC = 10 cm and BD : DC = 3 : 1, then what is the length of AC?
(a) 2.5 cm (b) 6 cm
(c) 7.5 cm (d) 8 cm
[CDS-2025 (1)]

373. The measure of an angle formed by the bisectors of the angles A and C of a triangle ABC is 130°. What is the measure of angle B?
(a) 65° (b) 75°
(c) 80° (d) 85°
[CDS-2025 (1)]

374. Let AD be the altitude of a triangle ABC. If (AB + AC) = p, (AB – AC) = q and (BD – CD) = r, then what is BC equal to?
(a) qr/p (b) pr/q
(c) pq/r (d) p + q – r
[CDS-2025 (2)]

375. ABC is a triangle right angled at B. P is the midpoint of AB and Q is the midpoint of BC. Consider the following:
I. AQ = √73 units
II. CP = √52 units
Which of the above is/are required to determine the area of the triangle?
(a) I only
(b) II only
(c) Both I and II
(d) More information is needed
[CDS-2025 (2)]

376. In a circle of radius 14 cm, APB is a shorter arc and P is the midpoint of the arc. Let C be the midpoint of the chord AB and PC = 7 cm. What is the length of the chord AP?
(a) 3.5 cm (b) 7 cm
(c) 10.5 cm (d) 14 cm
[CDS-2025 (2)]

377. Two poles of heights 10 m and 15 m are 25 m apart. What is the height of the point of intersection of the lines joining the tip of each pole to the foot of the other pole?
(a) 4·8 m (b) 5 m
(c) 6 m (d) 6·4 m
[CDS-2025 (2)]

378. ABC is a triangle right angled at B. Further, (AB + BC) exceeds AC by 10 units. If the perimeter of the triangle is 60 units, then what is the area of the triangle?
(a) 75 square units (b) 100 square units
(c) 125 square units (d) 150 square units
[CDS-2025 (2)]

379. Two poles are situated 24 m apart and their heights differ by 10 m. What is the distance between their tips?
(a) 25 m (b) 26 m
(c) 30 m (d)Cannot determined
[CDS-2025 (2)]

380. Let X, Y and Z be the midpoints of the sides BC, CA and AB of a triangle ABC respectively. Consider the following statements:
I. The quadrilateral AZXY is a parallelogram.
II. The area of the quadrilateral AZXY is half of the area of the triangle ABC.
Which of the statements given above is/are correct?
(a) I only (b) II only
(c) Both I and II (d) Neither I nor II
[CDS-2025 (2)]

381. Consider the following angles:
I. 4° II. 5° III. 6° IV. 8°
How many of the above can be the exterior angle of a regular polygon?
(a) One (b) Two
(c) Three (d) All four
[CDS-2025 (2)]

382. ABC is a triangle right angled at B. D is a point on AC such that BD is perpendicular to AC. If AB = p and BC = √3p, then what is BD equal to?
(a) p/3 (b) p/2
(c) √3p/2 (d) √3p/4
[CDS-2025 (2)]

383. The difference between an interior angle and an exterior angle of a regular polygon is 120°. What is the number of sides of the polygon?
(a) 9 (b) 10
(c) 11 (d) 12
[CDS-2025 (2)]

384. An angle θ is exactly one-fourth of its complementary angle. What is the value of angle θ?
(a) 12° (b) 15°
(c) 18° (d) 20°
[CDS-2025 (2)]

385. A pendulum swings through an angle of 30° and its end describes an arc of length 55 cm. What is the length of the pendulum? (Take π = 22/7)
(a) 90 cm (b) 100 cm

(c) 105 cm (d) 110 cm

[CDS-2025 (2)]

Consider the following for the next five items that follow:

Each item contains a Question followed by two Statements. Answer each item using the following instructions:

Choose option

(a) If the Question can be answered by one of the Statements alone, but not by the other.

(b) If the Question can be answered by either Statement alone

(c) If the Question can be answered by using both the Statements together, but cannot be answered by using either Statement alone.

(d) If the Question can be answered even without using any of the Statements

[CDS-2025 (2)]

386. Question: In a triangle ABC, $\angle A = \angle B - \angle C$. Is angle A acute?

Statement I: ABC is not an obtuse-angled triangle.

Statement II: Angle C is acute.

387. Question: In a triangle ABC right angled at B, AC = 20 cm. What is the circum-radius of the triangle?

Statement I: AB = 12 cm

Statement II: BC = 16 cm

388. Question: AB and CD are chords of a circle intersecting at P. If

AP × PB = 48 square units, then what is CP × PD equal to?

Statement I: AP = 10 units

Statement II: AP = 8 units

389. Question: In a quadrilateral ABCD, AB = 6 units, BC = 18 units, CD = 5 units, DA = 9 units. What is the length of diagonal BD?

Statement I: The length of BD is an integer greater than 13.

Statement II: The length of BD is an even integer

390. Question: The diagonals of a rhombus ABCD are in the ratio 5:12. If one of the diagonals equals to the side of the rhombus, what is the sum of the diagonals?

Statement I: The sum of the diagonals is 34 cm.

Statement II: The length of side = 13 cm

ANSWER KEY																			
1.	d	2.	d	3.	d	4.	d	5.	d	6.	d	7.	d	8.	d	9.	c	10.	b
11.	c	12.	c	13.	c	14.	d	15.	c	16.	d	17.	b	18.	b	19.	d	20.	d
21.	b	22.	a	23.	c	24.	c	25.	c	26.	c	27.	d	28.	b	29.	b	30.	a
31.	a	32.	d	33.	a	34	d	35.	a	36.	a	37.	b	38.	b	39.	d	40.	d
41.	c	42.	d	43.	c	44.	b	45.	b	46.	b	47.	d	48.	d	49.	d	50.	a
51.	c	52.	a	53.	c	54.	a	55.	c	56.	d	57.	d	58.	b	59.	d	60.	a
61.	a	62.	c	63.	a	64.	a	65.	a	66.	d	67.	d	68.	c	69.	d	70.	c
71.	a	72.	a	73.	c	74.	c	75.	d	76.	a	77.	c	78.	b	79.	c	80.	d
81.	c	82.	a	83.	b	84.	c	85.	b	86.	b	87.	c	88.	b	89.	c	90.	d
91.	c	92.	a	93.	c	94.	d	95.	c	96.	d	97.	c	98.	c	99.	a	100.	d
101.	a	102.	b	103.	c	104.	c	105.	d	106.	d	107.	d	108.	d	109.	b	110.	c
111.	c	112.	b	113.	c	114.	b	115.	b	116.	d	117.	b	118.	b	119.	c	120.	c
121.	a	122.	c	123.	c	124.	d	125.	c	126.	c	127.	d	128.	b	129.	a	130.	d
131.	c	132.	d	133.	b	134.	b	135.	c	136.	b	137.	c	138.	c	139.	d	140.	c
141.	b	142.	a	143.	b	144.	a	145.	c	146.	c	147.	c	148.	a	149.	c	150.	b
151.	c	152.	c	153.	d	154.	d	155.	a	156.	a	157.	b	158.	c	159.	c	160.	b
161.	b	162.	c	163.	d	164.	a	165.	b	166.	c	167.	b	168.	c	169.	c	170.	c
171.	c	172.	a	173.	c	174.	d	175.	a	176.	c	177.	c	178.	a	179.	b	180.	b
181.	d	182.	c	183.	d	184.	d	185.	a	186.	b	187.	b	188.	b	189.	b	190.	b
191.	b	192.	c	193.	b	194.	d	195.	d	196.	d	197.	b	198.	a	199.	a	200.	b
201.	c	202.	a	203.	d	204.	c	205.	b	206.	c	207.	d	208.	d	209.	c	210.	d
211.	c	212.	b	213.	c	214.	b	215.	a	216.	b	217.	b	218.	a	219.	d	220.	b
221.	c	222.	b	223.	c	224.	c	225.	a	226.	d	227.	d	228.	b	229.	c	230.	b
231.	a	232.	c	233.	a	234.	a	235.	c	236.	c	237.	b	238.	b	239.	a	240.	b
241.	a	242.	c	243.	b	244.	c	245.	a	246.	c	247.	a	248.	d	249.	a	250.	b
251.	b	252.	d	253.	c	254.	b	255.	b	256.	b	257.	a	258.	d	259.	b	260.	b
261.	c	262.	d	263.	c	264.	c	265.	d	266.	c	267.	c	268.	c	269.	c	270.	c
271.	d	272.	b	273.	c	274.	d	275.	c	276.	b	277.	a	278.	b	279.	c	280.	b
281.	c	282.	c	283.	c	284.	d	285.	b	286.	d	287.	c	288.	a	289.	a	290.	b
291.	b	292.	c	293.	b	294.	d	295.	b	296.	b	297.	c	298.	d	299.	d	300.	c
301.	b	302.	a	303.	c	304.	a	305.	d	306.	d	307.	a	308.	b	309.	d	310.	d
311.	c	312.	a	313.	c	314.	d	315.	c	316.	b	317.	c	318.	d	319.	c	320.	c
321.	b	322.	a	323.	b	324.	c	325.	b	326.	c	327.	a	328.	b	329.	b	330.	c
331.	d	332.	a	333.	d	334.	c	335.	d	336.	d	337.	c	338.	c	339.	d	340.	a
341.	b	342.	b	343.	c	344.	b	345.	b	346.	a	347.	c	348.	d	349.	a	350.	b
351.	d	352.	b	353.	a	354.	d	355.	d	356.	a	357.	b	358.	c	359.	d	360.	a
361.	c	362.	d	363.	a	364.	a	365.	b	366.	b	367.	c	368.	b	369.	a	370.	a
371.	a	372.	a	373.	c	374.	c	375.	c	376.	d	377.	c	378.	d	379.	b	380.	c
381.	d	382.	c	383.	d	384.	c	385.	c	386.	d	387.	d	388.	d	389.	b	390.	d

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CAPF PYQ

1. The angle (in degrees) made by a sector having area one-sixth of the area of a semicircle is?

[CAPF 2023]

(a) 15° (b) 30°
(c) 45° (d) 60°

2. The right-angled triangle ABC is such that €B = 90° . Point D is picked on BC such that triangle ABC and DBA are similar. If AB : BC = m : n, what is ΔABC : ΔABD, where Δ denotes the area of a triangle ?

[CAPF 2024]

(a) n : m (b) $n^2 : m^2$
(c) (m + n) : n (d) $(m + n)^2 : n^2$

3. A point P on the ground is on the same line as the bases and the tips of a pair of trees A and B such that P is on the left of both these trees the ratio heights of A and B is 1 : 3. If the distance between P and A is a metre, then the distance between A and B, in metre, is

[CAPF 2025]

(a) a (b) 2a
(c) 3a (d) 4a

ANSWER KEY

1.	a	**2.**	b	**3.**	b													