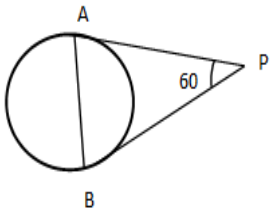
INDIAN SCHOOL MUSCAT – SENIOR SECTION – DEPARTMENT OF MATHEMATICS

QUESTION BANK 3– MATHEMATICS – CLASS 10 (2019 – 20)

S.NO	MCQ(1 Mark Each)
1	A number selected at random from the numbers 1 to 30.The probability that it is a prime number is (a)$\frac{1}{6}$ (b) $\frac{2}{3}$ (c) $\frac{1}{3}$ (d)$\frac{11}{30}$
2	The diameter of a circle whose area is equal to the sum of the areas of two circles of radii 24 cm and 7 cm is (a)31 cm (b) 50 cm (c)62 cm (d)25 cm
3	If sin A = $\frac{1}{2}$,then the value of cot A is (a) $\frac{1}{\sqrt{3}}$ (b) 1 (c) $\frac{\sqrt{3}}{2}$ (d)$\sqrt{3}$
4	From a point Q ,the length of the tangent to a circle is 24 cm and the distance of Q from the centre is 25 cm.The radius of the circle is (a) 12 cm (b) 7 cm (c) 15cm (d)24.5cm
5	In ΔABC and ΔDEF ,$\frac{AB}{DE} = \frac{BC}{FD}$, then they will be similar if, (a) ∠B =∠E (b) ∠B = ∠D (c) ∠A = ∠D (d)∠A = ∠F
6	The quadratic equation $2x^2 - \sqrt{5}\,x + 1 = 0$ has (a) two distinct real roots(b) no real roots (c) two equal real roots (d)more than two real roots
7	x^2-1 is divisible by 8,if x is (a) an integer (b) a natural number(c) an even integer(d) an odd integer
8	In an AP ,the first term is 1,n^{th} term is 20 and the sum to n terms is 399 ,then value of n is (a) 38 (b) 19 (c) 42 (d)21
9	The pair of equations x + 2y +5 =0 and -3x -6y +1 =0 have (a) a unique solution (b)exactly two solutions (c) no solution (d)infinitely many solutions
10	The abscissa of the point of intersection of less than type and more than type ogives of a grouped data gives (a) Mean (b) Mode (c)Median (d)Class mark
11	If cos$(\alpha+\beta)$ = 0,then sin$(\alpha-\beta)$ can be reduced to (a) cosβ (b) sinα (c) sin2α (d)cos2β
12	A circle with centre O inscribed in a quadrilateral ABCD such that ∠AOB = 75°,then ∠COD is equal to (a) 150° (b) 105° (c)15° (d)45°
13	The 21st term of an AP whose first two terms are -3 and 4 is (a) 137 (b) 153 (c) -143 (d)17
14	The point which divides the line segment joining the points (7,-6) and (3,4) internally in the ratio 1:2 lies in the (a) first quadrant (b)third quadrant (c) fourth quadrant (d)second quadrant
15	If ΔABC ~ Δ PQR and $\frac{AB}{PQ} = \frac{1}{3}$,then $\frac{ar(\Delta PQR)}{ar(\Delta ABC)}$ is equal to (a) 3 (b) 9 (c)$\frac{1}{9}$ (d)$\frac{1}{3}$
16	The area of the largest triangle that can be inscribed in a semicircle of radius á' is (a) a^2 sq. units (b) $\frac{1}{2}a^2$ sq. units (c) $2a^2$ sq. units (d)$\sqrt{2}\,a^2$ sq. units
17	For some integer 'n',every odd integer is of the form (a) 2n (b) n (c) 2n+1 (d)n+1
18	The probability that a non –leap year selected at random will have 53 Sundays is

	(a) $\frac{1}{7}$ (b) $\frac{2}{7}$ (c) $\frac{5}{7}$ (d)$\frac{3}{7}$
19	In ΔABC ,∠C =90° ,then sin(B+A) is equal to (a) 1 (b) 0 (c) $\frac{1}{2}$ (d)$\frac{\sqrt{3}}{2}$
20	The sum of first five multiples of 5 is (a) 45 (b) 75 (c) 15 (d)25
21	The pair of equations y = 0 and y = - 5 has (a) a unique solution (b) two solutions (c)infinitely many solutions (d)no solution
22	The distance of the point (6 , - 8) from the origin is (a) 14 units (b) 2 units (c) 10units (d)$\sqrt{7}$ units
23	PQ and PR are two tangents from an external point P to a circle with centre Ó' and ∠QPR = 46°,then ∠QOR is (a) 144° (b)44° (c) 134° (d)180°
24	The pair of equations x = 3 and y = 5 graphically represents lines which are (a)coincident (b) intersecting at (3,5) (c) parallel (d) intersecting at(5,3)
25	The sum of first 10 positive integers divisible by 6 is (a) 160 (b) 330 (c) 60 (d)66
26	The sides of two similar triangles are in the ratio 4:9,then the areas of these triangles are in the ratio (a) 81:16 (b) 2:3 (c) 16:81 (d)3:2
27	The area of a square that can be inscribed in a circle of radius 8 cm is (a) 256 cm^2 (b) 64 cm^2 (c) 128 cm^2 (d) $64\sqrt{2}$ cm^2
28	If 4 tanθ = 3 ,then $\frac{\sin\theta-\cos\theta}{\sin\theta+\cos\theta}$ is (a) $\frac{1}{3}$ (b) $\frac{-1}{7}$ (c) $\frac{3}{4}$ (d)$\frac{1}{2}$
29	The distance between the point (0,6) and (0,-2) is (a) 2 units (b) 8 units (c) 4 units (d) 6 units
30	The surface area of two spheres are in the ratio 9:16,then the ratio of their volumes is (a) 4:3 (b) 27:64 (c)6:8 (d)81:256
31	In D ABC, right-angled at B, AB = 5 cm and ÐACB = 30° then the length of the side ACis (a) $5\sqrt{3}$cm (b) 10cm (c) $2\sqrt{3}$cm (d)$\frac{5}{2}$ cm
32	If Sin (A + B) = 1 = cos (A – B) ,then (a) A = B = 90^0 (b) A = B= 0^0 (c) A = B= 45^0 (d) A =2B
33	If the angles of elevation of the top of a tower from two points at a distance of 4 m and 9mfrom the base of the tower and in the same straight line with it are complementary, then the height of thetower is (a) 10m (b)6m (c)8m (d) 13 m
34	The ratio of the length of a vertical stick and its shadowis 1:$\sqrt{3}$,then the angle of elevation of the sunis (a) 30^0 (b)60^0 (c)45^0 (d) 90°
35	The tops of two poles of height 20m and 14m are connected by a wire. If the wire makes an angle of elevation 30^0 with horizontal, then the length of the wireis (a)12m (b)10m (c)8m (d) 6m
36	In the figure, PA and PB are tangents such that PA = 9cm and ÐAPB = 60^0. Find the length of the chordAB.



(a) 4cm (b)7cm (c)6cm (d) 9cm

37 The common point of a tangent to a circle with the circle iscalled
(a) centre (b) point of contact (c) endpoint (d) none ofthese.

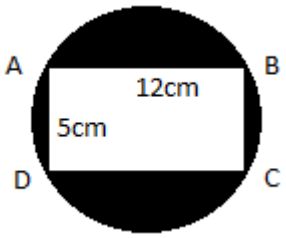
38 The number of circles can be drawn through three given non – collinear points is
(a) 2 (b) 1 (c) 0 (d) Infinite

39 A steel wire when bent in the form of a square encloses an area of 121 sq. cm. The same wire is bent in the form of a circle. Find the area of thecircle.
(a) 111cm^2 (b)184 cm^2 (c)154cm^2 (d) 259cm^2

40 If the perimeter of a semicircular protractor is 36 cm, find thediameter.
(a)14cm (b)16 cm (c)18cm (d) 12cm

41 A sector is cut from a circle of radius 21 cm. The angle of the sector is 150^0,then the length of the arc is
(a)56cm (b)57 cm (c)55cm (d) 58cm

42 The area of the shaded region in the given figure is (Take p =3.14)



(a)75cm^2 (b)72cm^2 (c)70cm^2 (d) none ofthese

43 A pendulum swings through an angle of 30^0 and describes an arc 8.8 cm in length. Find the length of the pendulum.

(a)16cm (b)16.5cm (c)16.8cm (d) 17cm

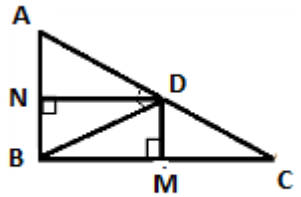
44 The curved surface area of a cylinder of height 14 cm is 88 cm^2. The diameter of its circular base is
(a)5cm (b)4cm (c)3cm (d)2cm

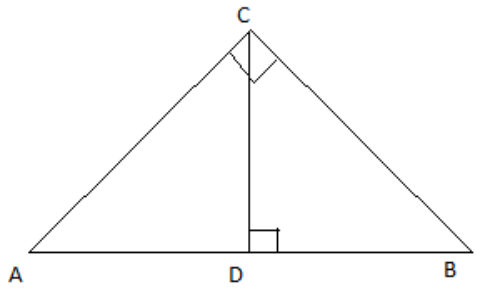
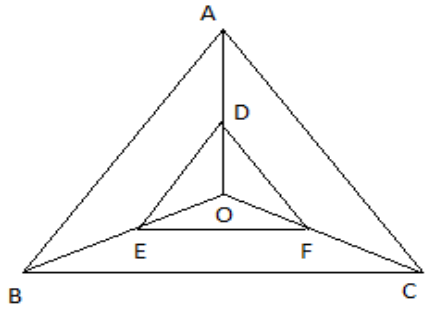
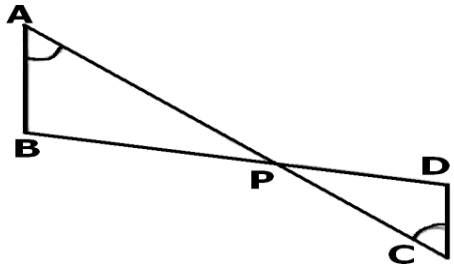
45 The curved surface area of a right circular cone of slant height 10 cm and base radius 10.5 cm is
(a)185cm^2 (b)160 cm^2 (c) 165cm^2 (d) 195cm^2

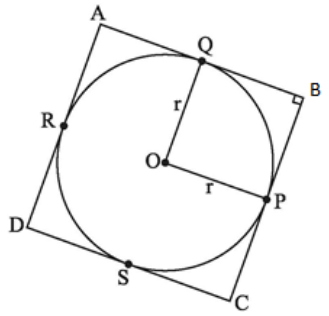
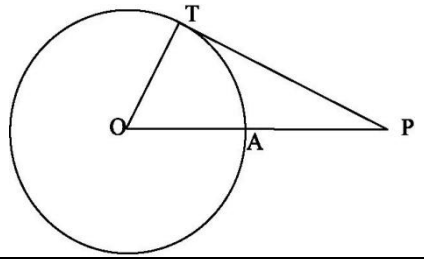
46 The median class of the following distributionis

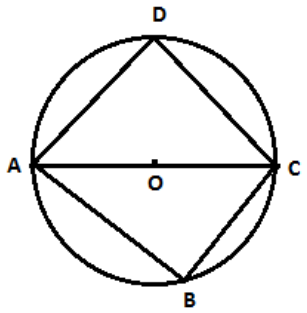
C.I	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
F	8	10	12	22	30	18

	(a) 10–20 (b) 20–30 (c) 30–40 (d) 40 –50
47	The arithmetic mean of 12 observations is 7.5. If the arithmetic mean of 7 of these observations is 6.5, the mean of the remaining observationsis (a)5.5 (b)8.5 (c)8.9 (d)9.2
48	The class marks of a distribution are 15,20,25,…… 45. The class corresponding to 45is (a) 12.5–17.5 (b) 22.5–27.5 (c) 42.5–47.5 (d) 43−47
49	Cards are marked with numbers 1 to 50 are placed in the box and mixed thoroughly. One card is drawn at random from the box. What is the probability of getting a prime number? (a) $\frac{1}{2}$ (b) $\frac{3}{10}$ (c) $\frac{2}{5}$ (d)$\frac{7}{25}$
50	One card is drawn from a well-shuffled deck of 52 cards,the probability of getting a facecard is (a) $\frac{2}{26}$ (b) $\frac{3}{13}$ (c) $\frac{4}{13}$ (d)$\frac{1}{4}$
	SA I –SHORT ANSWER TYPE QUESTIONS (2 Marks Each)
51	Write whether the square of any positive integer can be of the form 3*m*+2, where *m* is a natural number. Justify your answer.
52	Show that any positive odd integer is of the form 6q + 1 or 6q + 3 or 6q + 5 where *q* is an integer.
53	If LCM (480, 672) = 3360, find HCF (480,672)
54	Explain why 3 × 5 × 7 + 7 is a composite number.
55	A rational number in its decimal expansion is 327.7081. What can you say about the prime factors of *q*, when this number is expressed in the form $\frac{p}{q}$?
56	Find a quadratic polynomial whose sum and product of zeroes are 3 and $\sqrt{2}$ respectively.
57	Find the zeroes of the polynomial mx^2+ (m + n) x +n.
58	If m and n are zeroes of the polynomial $3x^2$+ 11x – 4, find the value of $\frac{m}{n} + \frac{n}{m}$
59	Write a quadratic polynomial, sum of whose zero is $2\sqrt{3}$and their product is 2.
60	If α and β are the zeroes of the quadratic polynomial f(x) = kx^2+ 4x + 4 suchthat$\alpha^2 + \beta^2$=24, find the value of 'k'.
61	Solve for x and y: 23x – 29 y = 98; 29x – 23y = 110
62	Find the value of k, so that the following system of equations has a non-zero solution: 3x + 5y = 0; kx + 10y =0.
63	Find the value of k, so that the following system of equations has no solution: 3x + y=1; (2k-1) x+(k-1)y=(2k+1).
64	Find the value of k, so that the following system of equations has a unique solution: kx + 3y = (k - 3); 12x + ky = k.
65	Find the value of a and b for which the following systems of linear equations has a infinite number of solutions: (2a -1)x + 3y=5;3x+(b-1)y=2
66	Find the value of k, so that the following system of equations has a non-zero solution: 5x – 3y = 0; 2x + ky = 0.
67	The sum of two numbers is 137 and their difference is 43. Find the numbers.
68	The larger of two supplementary angles exceeds the smaller by 18 degrees. Find them.
69	Solve the following quadratic equation: $8a^2 – 27ab + 9b^2 = 0$

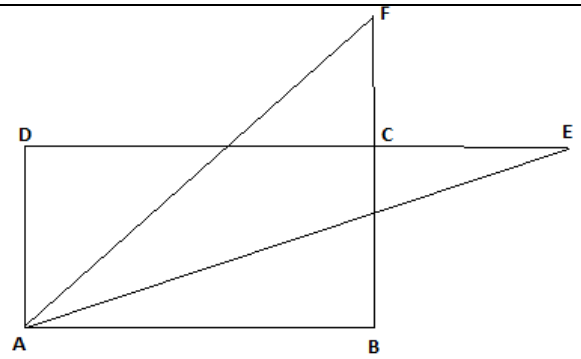
70	Solve the following quadratic equation: $4\sqrt{3}x^2 + 5x - 2\sqrt{3} = 0$
71	Solve the following by Factorisation method: $\sqrt{3}x^2 + 11x + 6\sqrt{3} = 0$
72	Solve the following quadratic equation (if they exist) by the method of completing the square: $8x^2 - 22x - 21 = 0$
73	Show that the following equation has real roots, and solve it by using the quadratic formula: $2x^2 - 7x - 15 = 0$
74	Find the value of k for which the quadratic equation $2x^2 + kx + 3 = 0$ has two real equal roots.
75	If –5 is a root of the equation $2x^2 + px - 15 = 0$ and the equation $p(x^2 + x) + k = 0$ has equal roots, find the value ofk.
76	Solve the equation $2x^2 - 5x + 3 = 0$ by the method of completing the square.
77	Check whether 51 is a term of the AP 5, 8, 11, 14, ……?
78	Find 25th term oftheAP 5, $4\frac{1}{2}$, 4, $3\frac{1}{2}$, 3 ……
79	The 17th term of an AP exceeds its 10th term by 7. Find the common difference.
80	If 2x, x + 10, 3x + 2 are in A.P., find the value ofx.
81	Find the 20th term from the last term of the AP: 3, 8, 13, . . .,253.
82	If the nth term of an AP is (5n – 2), find its first term and common difference. Also find its 30thterm.
83	For what value of *n*, are the *n*th terms of two APs: 63, 65, 67,…….. and 3, 10, 17, ……equal?
84	How many terms are there in the AP 7, 11, 15, ….. ,139?
85	Find the sum of all two digit odd positive numbers
86	Which term of the AP 9, 12, 15, 18,…. will be 39 more than its 36thterm?
87	Which term of the AP 24, 21, 18, 15, ….Is the first negative term?
88	Write the next term of the AP $\sqrt{8}, \sqrt{18}, \sqrt{32}$,……
89	In an A.P., the sum of first n terms is $\frac{3n^2}{2} + \frac{5n}{2}$.Find its 20th term.
90	Prove that the points (1,-1), $(\frac{-1}{2}, \frac{1}{2})$ and (1,2) are the vertices of an isosceles triangle.
91	Using distance formula, show that the points (-3, 2), (1, -2) and (9, -10) are collinear.
92	The length of a line-segment is 10 units. If one end is at (2, -3) and the abscissa of the second end is 10, show that its ordinate is either 3 or -9.
93	In what ratio does the X-axis divide the line segment joining the points (2, -3) and (5, 6)?
94	Find the value of x, if the distance between the points (x, -1) and (3, 2) is 5 units.
95	The abscissa of a point is twice its ordinate and the sum of the abscissa and the ordinate is -6. What are the coordinates of the point?
96	If A(-2, -1), B(a, 0), C(4, b) and D(1, 2) are the verities of a parallelogram, find the values of a and b.
97	D and E are respectively the points on the sides AB and AC of a DABC such that AB = 12 cm, AD = 8 cm, AE = 12 cm and AC = 18 cm, show that DE || BC.
98	In the figure,ABC is a right angle triangle with ∠ABC =90°, BD⊥AC , DM ⊥BC , and DN⊥AB. Prove that DM^2 = DN x MC 

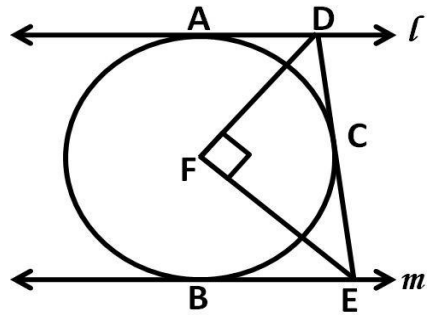
99	In figure, $\angle ACB = 90^0$, $CD \perp AB$ prove that $CD^2 = BD.AD$. 
100	Any point O, inside ΔABC, is joined to its vertices. From a point D on AO, DE is drawn so that DE||AB and EF||BC as shown in figure. Prove that DF||AC. 
101	In the below figure, if $\angle A = \angle C$, AB = 6 cm, BP = 15 cm, AP = 12 cm and CP = 4 cm, then find the lengths of PD andCD. 
102	In a triangle ABC, $\angle B = 90^0$, AB = 24 cm and BC = 7 cm. Find Sin A &Cos A
103	Evaluate:$\sin 60^\circ \sin 45^\circ - \cos 60^\circ \cos 45^\circ$
104	Evaluate : $4(\sin^4 30^0 + \cos^4 60^0) - 3(\cos^2 45^0 - \sin^2 90^0) + 5\cos^2 90^0$
105	If $A = 45^0$, verify that $\cos 2A = 2\cos^2 A - 1 = 1 - 2\sin^2 A$
106	If $A = B = 45^0$, verifythat: (i) $\cos(A + B) = \cos A\cos B - \sin A\sin B$ (ii) $\sin(A + B) = \sin A\cos B + \cos A\sin B$
107	Express $\sin 67^0 + \cos 75^0$in terms of trigonometric ratios of angles between 0^0 and45^0.
108	If $\sec 4A = \operatorname{cosec}(A - 20^0)$, where 4A is an acute angle, find the value ofA.
109	If $\tan 2A = \cot (A - 40^0)$, where 2A is an acute angle, find the value ofA.
110	Evaluate: $\tan 10^0 \tan 15^0 \tan 75^0 \tan 80^0$
111	The angle of elevation of the top of a tower, as seen from two points A & B situated in the same line and at distances 'p' and 'q' respectively from the foot of the tower, are complementary, then find the height of the tower
112	Upper part of a vertical tree which is broken over by the winds just touches the ground and makes an angleof 30°with the ground. If the length of the broken part is 20 metres, then find the length of the remaining part of the tree.
113	The Shadow of a tower, when the angle of elevation of the sun is 30°, is found to be 5 m longer than when it was 45°.Find the height of tower.

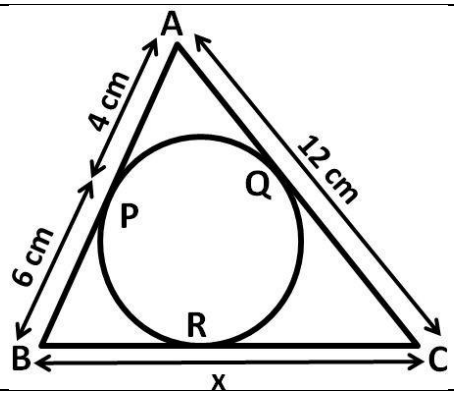
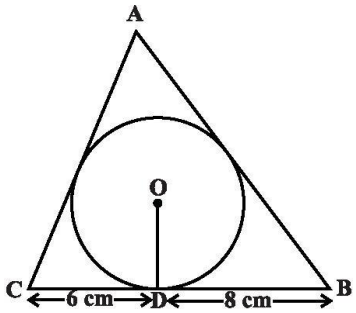
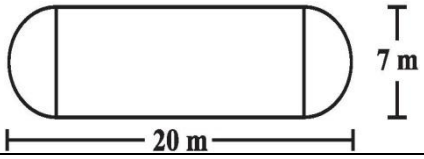
114	How many balls, each of radius 1 cm, can be made from a solid sphere of lead of radius 8 cm?
115	The diameter of cycle wheel is 28 cm. How many revolutions will it make in moving 13.2 km?
116	An arc subtends an angle of 90°at the centre of the circle of radius 14 cm. Write the area of minor sector thus form in terms of π.
117	The length of a minor arc is 2/9 of the circumference of the circle. Write the measure of the angle subtended by the arc at the centre of the circle.
118	Two circle touch internally. The sum of their areas is 116 cm^2 and the distance between there centres is 116π cm^2. Find the radius of circles.
119	The slant height of the frustum of a cone is 5 cm. If the difference between the radii of its two circular ends is 4cm. Write the height of the frustum.
120	Find the number of metallic circular disk with 1.5cm base diameter and of height 0.2 cm to be melted to form a right circular cylinder of height 10cm and diameter 4.5cm?
121	ABC is an isosceles triangle in which AB = AC, circumscribed about a circle. Show that BC is bisected at the point ofcontact.
122	In Fig., a circle is inscribed in a quadrilateral ABCD in which $\angle B = 90^0$. If AD = 23 cm, AB = 29 cm and DS = 5 cm, find the radius (r) of thecircle. 
123	In the below figure PT is tangent to a circle with centre O, PT = 36 cm, AP = 24 cm. Find the radius of thecircle. 
124	The mean of 10 observations is 42. If each observation in the data is decreased by 12, find the new mean of the data.
125	Two dice are thrown at the same time and the product of numbers appearing on them is noted. Find the probability that the product is less than9.
126	Two dice are thrown simultaneously. Find the probability ofgetting (i) an even number as thesum (ii) a multiple of 3 as thesum
127	One card is drawn from a well-shuffled deck of 52 cards. Find the probability ofgetting (i) either red or kingcard (ii) neither an ace nor aking
128	Two coins are tossed simultaneously. Find the probability ofgetting (i) at most one tail (ii) at least one head
129	Three coins are tossed simultaneously. What is the probability ofgetting (i) at most two heads (ii) one head or twoheads
130	A bag contains 5 red balls, 8 white balls and 4 green balls. One ball is taken out of the bag at

	random. What is the probability that the ball taken out will be (i) notgreen? (ii) neither red ball nor whiteball?
	SA-II SHORT ANSWER TYPE QUESTIONS (3 Marks Each)
131	The sum of three numbers of AP is 3 and their product is -35. Find the numbers.
132	Which term of the AP 3, 10, 17, …….. will be 84 more than its 13th term?
133	In the given figure, AOC is a diameter of the circle. If AB= 7cm, BC = 6 cm and CD = 2cm. Find the perimeter of the cyclic quadrilateral ABCD. 
134	Draw a pair of tangents to a circle of radius 3 cm, which are inclined to each other at an angle of 60°
135	Draw a right triangle in which the sides(other than hypotenuse) are of lengths 4 cm and 3 cm. Then construct another triangle whose sides are $\frac{5}{3}$times the corresponding sides of the given triangle.
136	Find the ratio in which the segment joining the points (-3,10) and (6,-8) is divided by (-1,6)
137	Find the area of the quadrilateral whose vertices taken in order are (-4,-2); (-3,-5); (3,-2);(2,3)
138	A drinking glass is in the shape of a frustum of a cone of height 14 cm. The diameters of its two circular ends are 4 cm and 2 cm. Find the capacity of the glass.
139	Find the zeroes of $5x^2 - 4 - 8x$. Verify the relationship between he zeroes and coefficients.
140	If $(x - 2)$ is one of the factors of $x^3 - 3x^2 - 4x + 12$, find the other zeroes.
141	Find all the zeroes of the polynomial $4x^4 - 20x^3 + 23x^2 + 5x - 6$, if two of its zeros are 2 and 3.
144	What must be subtracted from $8x^4 + 14x^3 - 4x^2 + 7x - 8$ so that the resulting polynomial is exactly divisible by $4x^2 + 3x - 2$?
145	When we add $p(x)$ to $4x^4 + 2x^3 - 2x^2 + x - 1$ the resulting polynomial is divisible by $x^2 + 2x - 3$ find $p(x)$.
146	Check whether 14^n can end with the digit zero for any natural number$n$.
147	Show that 9^ncan never ends with the digit zero for any natural number n.
148	If the HCF of 210 and 55 is expressible in the form $210 \times 5 + 55y$ then find y.
149	Find HCF of 56, 96 and 324 by Euclid's algorithm.
150	Show that the square of any positive integer is either of the form $3m$ or $3m + 1$ for some integer m.
151	Prove that the square of any positive integer is of the form $5q$, $5q + 1$, $5q+ 4$ for some integer, q.
152	Prove that $\frac{1}{2-\sqrt{5}}$ is an irrational number.
153	Prove that $5 - \frac{2}{7}\sqrt{3}$ is an irrational number
154	Prove that $\sqrt{2} + \sqrt{7}$ is an irrational number.
155	Prove that $\sqrt{5}$ is irrational
156	Prove that $\sqrt{13}$ is irrational
157	What type of decimal expansion will $\frac{69}{60}$ represent? After how many places will the decimal expansion terminate?
158	Construct a tangent to a circle of radius 2 cm from a point on the concentric circle of radius 2.5 cm and measure its length. Also, verify the measurements by actual calculations.
159	Draw a triangle ABC with side BC=7cm,∠B=45°,∠A=105°.Then,constructatriangle

	whose sides are $\frac{4}{3}$times the corresponding sides of ΔABC.
160	Draw a circle of radius 3 cm. Take two points P and Q on one of its extended diameter each at a distance of 7 cm from its centre. Draw tangents to the circle from these two points P andQ.
161	Draw a line segment AB of length 8 cm. Taking A as centre, draw a circle of radius 4 cm and taking B as centre, draw another circle of radius 3 cm. Construct tangents to each circle from the centre of the other circle.
162	Construct an isosceles triangle whose base is 7 cm and altitude 4 cm and then construct another similar triangle whose sides are $\frac{3}{2}$ times the corresponding sides of the isosceles triangle.
164	Find the values of α andβ for which and following system of linearequations has infinite no of solutions : $2x + 3y = 7$, $2\alpha x + (\alpha + \beta)y = 28$.
165	Solve for *x* and *y* $139x + 56y = 641$ $56x + 139y = 724$
166	Solve for *x* and *y* $37x + 43y = 123$ $43x + 37y = 117$
167	Solve for *x* and *y* $\frac{5}{x+y} + \frac{1}{x-y} = 2$, $\frac{15}{x+y} - \frac{5}{x-y} = -2$
168	Solve for *p* and *q* $\frac{p+q}{pq} = 2$, $\frac{p-q}{pq} = 6$,$p \neq 0$,$q \neq 0$
169	Solve for *x* and *y* $\frac{2}{\sqrt{x}} + \frac{3}{\sqrt{y}} = 2$, $\frac{4}{\sqrt{x}} - \frac{9}{\sqrt{y}} = -1$, $x \neq 0$, $y \neq 0$
170	If from twice the greater of two numbers, 20 is subtracted, the result is the other number .If from twice the smaller number, 5 is subtracted, and the result is the greater number. Find the numbers.
171	In a function if 10 guests are sent from room *A* to *B*, the number of guests in room *A* and *B* are same. If 20 guests are sent from *B* to *A*, the numberof guests in *A* is double the number of guests in *B*. Find number of guests in both the rooms in the beginning.
172	Father's age is three times the sum of ages of his two children. After 5years his age will be twice the sum of ages of two children. Find the ageof the father.
173	Draw the graphs of $3x - 4y + 6 = 0$ and $3x + y - 9 = 0$. Also find the coordinates of the vertices of the triangle formed by these lines and the *x*-axis.
174	The sum of the numerator and denominator of a fraction is 8. If 3 is added to both the numerator and denominator, the fraction becomes 3/4. Find the fraction.
175	The monthly income of Sudheshna and Kriti are in the ratio 5: 4 and their monthly expenditures are in the ratio 7: 5. If each saves 3000 permonth. Find the monthly income of each.
176	In figure *ABCD* is a rectangle. *ADE* and *ABF* are two triangles such that $\angle E = \angle F$. Prove that $\frac{AD}{AE} = \frac{AB}{AF}$

	
177	In a rhombus, prove that four times the square of any sides is equal to the sum of squares of its diagonals.
178	In a triangle, if the square of one side is equal to the sum of the squareson the other two sides, then prove that the angle opposite to the first sideis a right triangle.
179	*ABCD* is a rectangle in which length is double of its breadth. Two equilateral triangles are drawn one each on length and breadth of rectangle. Find theratio of their areas.
180	Using quadratic formula, solve the equation:$p^2x^2+(p^2-q^2)x-q^2=0$
181	Solve the equation:$\frac{x}{x+1}+\frac{x+1}{x}=\frac{34}{15}$,$x\neq0, x\neq-1$
182	Find the roots of equation$\frac{1}{x+4}-\frac{1}{x-7}=\frac{11}{13}$,$x\neq-4,7$
183	Solve the following equation for 'x' : $9x^2-9(a+b)x+(2a^2+5ab+2b^2)=0$
184	If the roots of the equation $(a-b)x^2+(b-c)x+(c-a)=0$ are equal , prove that $2a=b+c$.
185	Solve for x: $9x^2-6ax+(a^2-b^2)=0$
186	If the roots of the equation $(1+m^2)x^2+2mcx+c^2-a^2=0$ has equal roots ,show that $c^2=a^2(1+m^2)$
187	An aeroplane when flying at a height of 4000 m from the ground passes vertically above another aeroplane at an instant when the angles of the elevation of the two planes from the same point on the ground are 60^0 and 45^0respectively. Find the vertical distance between the aeroplanes at that instant.
188	The angles of depression of the top and the bottom of an 8 m tall building from the top of a multi-storeyed building are 30° and 45°, respectively. Find the heightof the multi-storeyed building and the distance between the twobuildings.
189	If the angle of elevation of the cloud from a point h m above a lake is A and the angle of depression of its reflection in the lake is B, prove that the height of the cloud is $\frac{h(\tan B+\tan A)}{\tan B-\tan A}$
190	From a window, h metres above the ground of a house in a street , the angle of elevation and depression of the top and the foot of another house on the opposite side of the street are$\alpha$and βrespectively. Show that the height of the opposite house is $h(1+\tan\alpha\cot\beta)$
191	The angle of elevation of the top of a tower from a point on the same level as the foot of the tower is α. On advancing 'p' metres towards the foot of the tower the angle of elevation becomes β. Show that the height 'h' of the tower is given by $h=\left(\frac{p.\tan\alpha.\tan\beta}{\tan\beta-\tan\alpha}\right)$m
192	From the top of a light- house the angle of depression of two ships on the opposite sides of it are observed to be α and β. If the height of the light-house be 'h' metre and the line joining the ships passes through the foot of the light house, show that the distance between theships is $h\left(\frac{\tan\alpha+\tan\beta}{\tan\alpha.\tan\beta}\right)$m
193	Evaluate:$\frac{2\sin68°}{\cos22°}-\frac{2\cot15°}{5\tan75°}-\frac{3\tan45°.\tan20°.\tan40°.\tan50°.\tan70°}{5}$

194	Evaluate : $\frac{\sin^2 22^\circ+\sin^2 68^\circ}{\cos^2 22^\circ+\cos^2 68^\circ} + \sin^2 63^\circ + \cos 63^\circ . \sin 27^\circ$
195	Prove that : $\frac{\cos\theta}{1-\tan\theta} + \frac{\sin\theta}{1-\cot\theta} = \sin\theta + \cos\theta$
196	Prove that : $\frac{1}{2}\left[\frac{\sin\theta}{1+\cos\theta} + \frac{1+\cos\theta}{\sin\theta}\right] = \frac{1}{\sin\theta}$
197	Prove that : $\frac{\cos A-\sin A+1}{\cos A+\sin A-1}$ = cosec A + cot A
198	Prove that : $\sec^4 A(1 - \sin^4 A) - 2\tan^2 A = 1$
199	Prove that :$(\sin A + \text{cosec } A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$
200	If $\sin\theta + \sin^2\theta = 1$,prove that $\cos^2\theta + \cos^4\theta = 1$
201	The first and the last terms of an AP are 17 and 350 respectively. If the common difference is 9, how many terms are there and what is theirsum?
202	A spiral is made up of successive semicircles, with centres alternately at A and B, starting with centre at A, of radii 0.5 cm, 1.0 cm, 1.5 cm, 2.0 cm.....What is the total length of such aspiral made up of thirteen consecutive semicircles? (Take π=22/7)
203	Find the sum of all two digits natural numbers greater than 10 which, when divided by 7 leave remainder of4.
204	The sum of first 8 terms of an AP is 100 and the sum of its first 19 terms is 551. Find theAP.
205	Find the sum of first 24 terms of an AP whose *n*th term is given by $a_n = 3 + 2n$
206	Find the number of terms of the AP 63, 60, 57, ……. so that their sum is 693. Explain the double answer.
207	If the 5th and 12th terms of an AP are – 4 and – 18 respectively, find the sum of first 20 terms of the AP.
208	A manufacturer of TV sets produced 600 sets in the third year and 700 sets in the seventh year. Assuming that the production increases uniformly by a fixed number every year, find:(i) the production in the 1st year (ii) the production in the 10th year (iii) the total production in first 7 years.
209	In figure. *l*and *m* are two parallel tangents at A and B. The tangent at C makes an intercept DE between the tangent *l* and *m*. Prove that $\angle DFE = 90^0$ 
210	In the below figure, ΔABC circumscribesa circle by touching its sides at P,Q and R, find the value ofx.

	
211	A triangle ABC is drawn to circumscribe a circle of radius 4 cm such that the segments BD and DC into which BC is divided by the point of contact at D are of lengths 8 cm and 6 cm respectively. Find the sides AB andAC. 
212	Two tangents PA and PB are drawn to the circle with center O, such that $\angle APB = 120^0$. Prove that OP =2AP.
213	PA and PB are the two tangents to a circle with centre O in which OP is equal to the diameter of the circle. Prove that APB is an equilateral triangle.
214	Prove that the parallelogram circumscribing a circle is a rhombus.
215	Prove that "The tangent at any point of a circle is perpendicular to the radius through the point of contact".
216	Prove that "The lengths of tangents drawn from an external point to a circle are equal."
217	Prove that in two concentric circles, the chord of the bigger circle, which touches the smaller circle,is bisected at the point ofcontact.
218	The shape of a garden is rectangular in the middle and semicircularat the ends as shown in the figure. Find the area and the perimeter of thisgarden. 
219	Three horses are tethered with 7 m long ropes at the three corners of a triangular field having sides 20m, 34 m and 42 m. Find the area of the plot which can be grazed by the horses. Also, find the area of the plot, which remain sun grazed.
220	Find the area of the segment AB of a circle with centre 'O', angle AOB120^0 and radius OA = 18cm.
221	The minute hand of a circular clock is 15 cm long. Find the area swept and how far does the tip of the minute hand move in 35 minutes?
222	A chord of a circle of radius 14 cm makes a right angle at the centre. Find the areas of the minor and the major segments of thecircle.

223	In an equilateral triangle of side 12 cm, a circle is inscribed to touch its sides. Find the area of the portion of the triangle not included in the circle.(Use $\sqrt{3}$ = 1.73 &π =3.14)
224	The central angles of two sectors of circles of radii 7 cm and 21 cm are respectively 120° and 40°. Find the areas of the two sectors as well as the lengths of the correspondingarcs.
225	Three circles each of radius 3.5 cm are drawn in such a way that each of them touches the other two. Find the area enclosed between thesecircles.
226	A solid metallic hemisphere of radius 8 cm is melted and recasted into a right circular cone of base radius 6 cm. Determine the height of thecone.
227	A rectangular water tank of base 11 m × 6 m contains water up to a height of 5 m. If the water in the tank is transferred to a cylindrical tank of radius 3.5 m, find the height of the water level inthetank.
228	Water flows at the rate of 10m/minute through a cylindrical pipe 5 mm in diameter. How long would it take to fill a conical vessel whose diameter at the base is 40 cm and depth 24cm?
229	Water is flowing at the rate of 15 km/h through a pipe of diameter 14 cm into a cuboidal pond which is 50 m long and 44 m wide. In what time will the level of water in pond rise by 21cm?
230	A solid iron cuboidal block of dimensions 4.4 m × 2.6 m × 1m is recast into a hollow cylindrical pipe of internal radius 30 cm and thickness 5 cm. Find the length of thepipe.
231	From a solid cylinder whose height is 8cm and radius 6cm, a conical cavity of height 8cm and of base radius 6cm, is hollowed out. Find the volume of the remaining solid correct to two places of decimals. Also find the total surface area of the remaining solid [take =3.14]
232	A wooden article was made by scooping out a hemisphere from each ends of a solid cylinder. If the height of the cylinder is 20cm, and radius of the base is 3.5cm, find the total surface area of the article.
233	Two dice are thrown simultaneously. What is the probability that: (a) 5 will not come up either of them? (b)5 will come up on at least one? (C)5 will come at both dice?
234	The king, queen and jack of clubs are removed from a deck of 52 playing cards and remaining cards are shuffled. A card is drawn from the remaining cards. Find the probability of getting a card of (a)heart (b)queen (c)clubs
235	Five cards, the ten, jack, queen, king, and ace of diamonds are well shuffled with their face downward. One card is picked up at random (i) What is the probability that the card is the queen? (ii) If the queen is drawn and put aside what is the probability that the second card picked up is (a) an ace (b) a queen
236	The following table gives production yield per hectare of wheat of 100 farms of village. Write the above distribution to a more than type distribution.

Production (in kg/ha)	25-35	35-45	45-55	55-65	65-75	75-85
No. of Farms	4	6	10	26	35	19

237 If the mean of the following data is 50, then find the value of p.

Class Interval	0-20	20-40	40-60	60-80	80-100
Frequency	17	28	32	p	19

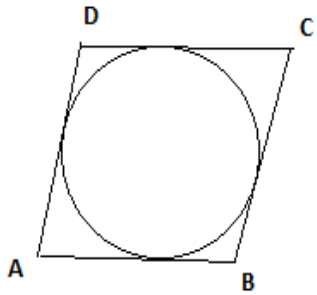
238 Find the median of the following data:

Class Interval	10-20	20-30	30-40	10-50	50-60	60-70	70-80
Frequency	12	30	34	65	46	25	18

LA-LONG ANSWER TYPE QUESTIONS (4 Marks Each)

239 (i)The greatest number that will divide 76,112,172 and 184 so as to leave remainder 40 in each case is k^2x3.Find the value of 'k'

	(ii)LCM of two numbers is 10 times their HCF.Sum of HCF and LCM is 495.If one number is 90,then find the other number
240	Prove that $\sqrt{7}$ is irrational and hence prove that $3 + 5\sqrt{7}$ is irrational.
241	On dividing $x^3 - 3x^2 + x + 2$ by a polynomial g(x), the quotient and remainder were x- 2 and -2x + 4 respectively. Find g(x)
242	Find all zeroes of the polynomial $2x^4 - 9x^3 + 5x^2 + 3x - 1$,if two of its zeroes are $(2 + \sqrt{3})$ and $(2 - \sqrt{3})$.
243	Solve for x and y : $\frac{6}{x+y} = \frac{7}{x-y} + 3$, $\frac{1}{2(x+y)} = \frac{1}{3(x-y)}$,where $x + y \neq 0$ & $x - y \neq 0$
244	4 Men and 6 Boys can finish a piece of work in 5 days while 3 Men and 4 Boys can finish it in 7 days. Find the time taken by 1 man alone or that 1 boy alone.
245	A takes 3 hours more than B to walk 30 km.But if A doubles his pace, he is ahead of B by 3/2 hours. Find their speed of walking.
246	A railway half ticket costs half the full fare and the reservation charge is the same on half ticket as on full ticket. One reserved first class ticket from Nagpur to Bhopal costs Rs.216 and one full and one half reserved first class ticket costs Rs.327.What is the basic first class full fare and what is the reservation charge?
247	Solve : $\frac{1}{2a+b+2x} = \frac{1}{2a} + \frac{1}{b} + \frac{1}{2x}$
248	Two taps running together can fill a tank in $3\frac{1}{13}$ hours. If one tap takes 3 hours more than the other to fill the tank, then how much time will each tap take to fill the tank?
249	In a flight of 2800 km, an aircraft was slowed down due to bad weather. Its average speed is reduced by 100kmph and time increased by 30 minutes. Find the original duration of the flight.
250	Solve : $\frac{2x}{x-3} + \frac{1}{2x+3} + \frac{3x+9}{(x-3)(2x+3)} = 0$,$x \neq 3, \frac{-3}{2}$
251	Which term of the AP -7,-12,-17,-22,……will be -82? Is -100 a term of the given AP? Give reasons for your answer.
252	If m^{th} term of an AP is $\frac{1}{n}$ and n^{th} term is $\frac{1}{m}$,then find the sum of its first mn terms.
253	If the sum of first 4 terms of an AP is 40 and that of first 14 terms is 280, find the sum of its first n terms.
254	Find the sum of the integers between 100 and 200 that are (i) divisible by 9 (ii) not divisible by 9
255	The sum of 4 consecutive numbers in an AP is 32 and the ratio of the product of the first and last term to the product of two middle terms is 7:15.Find the numbers
256	Sides AB and AC and median AD of ΔABC are respectively proportional to sides PQ, PR and median PM of another ΔPQR.Show that ΔABC ~ΔPQR.
257	In ΔABC, AB = AC and D is a point on side AC, such that BC^2 = AC x CD.Prove that BD = BC.
258	P and Q are points on the sides AB and AC respectively of ΔABC.If AP = 2 cm ,PB = 4 cm,AQ = 3 cm, QC = 6 cm,prove that BC = 3PQ
259	Prove that 'the ratio of the areas of two similar triangles is equal to the ratio of the squares of their corresponding sides'.
260	Prove that 'the ratio of the areas of two similar triangles is equal to the ratio of the squares of their corresponding medians'.
261	In a ΔABC, P divides the side AB such that AP: PB = 1:2. Q is a point on AC such that PQ || BC.Find the ratio of the areas of ΔAPQ and trapezium BPQC
262	In an equilateral ΔABC ,D is a point on the side BC, such that BD = $\frac{1}{3}$ BC.Prove that $9AD^2 = 7\ AB^2$
263	Prove that ,in a right triangle ,the square on the hypotenuse is equal to the sum of the squares on the other two sides
264	In an equilateral ΔABC ,D is a point on the side BC, such that BD = $\frac{1}{4}$ BC.Prove that $16AD^2 = 13\ BC^2$

265	If A is the area of a right angled triangle 'b' is one of the sides containing right angle. Prove that the length of altitude on the hypotenuse is $\frac{2Ab}{\sqrt{4A^2+b^4}}$
266	The area of a triangle is 5 square units. Two of its vertices are (2, 1) and (3,-2).Find the third vertex, if it lies on y = x + 3.
267	The three vertices of a parallelogram ABCD are A (3, -4), B (-1, -3) and C (-6, 2).Find the coordinates of vertex D and find the area of parallelogram ABCD.
268	If A(-2,1) ,B(a,0) ,C(4,b) and D(1,2) are the vertices of a parallelogram ABCD.Find the values of 'a' and 'b' and hence find the lengths of its sides.
269	Prove that :$\frac{sinA-2sin^3 A}{2cos^3 A-cosA} = tan\ A$
270	Prove that : $(sin\ A + sec\ A)^2 + (cos\ A + cosec\ A)^2 = (1 + sec\ A.cosec\ A)^2$
271	Prove that : sinθ(1 + tan θ) + cos θ(1+ cot θ) = sec θ + cosec θ
272	Prove that : $\frac{1}{\text{cosec}\ \theta-\cot\ \theta} - \frac{1}{\sin\ \theta} = \frac{1}{\sin\theta} - \frac{1}{\text{cosec}\ \theta+\cot\ \theta}$
273	From the top of a tower 100 m high, a man observes two cars on the opposite sides of the tower with angles of depression 30 ° and 45 ° respectively. Find the distance between the cars .($\sqrt{3}$ =1.732)
274	The angle of elevation of a cloud from a point 60 m above lake is 30° and the angle of depression of its reflection in the lake is 60°.Find the height of the cloud from the surface of the lake.
275	The angle of elevation of an aeroplane from a point on the ground is 60° .After a flight of 30 seconds the angle of elevation becomes 30°.If the aeroplane is flying at a constant height of 3000$\sqrt{3}$ m, find the speed of the aeroplane.
276	A moving boat is observed from the top of a 150 m high cliff moving away from the cliff. The angle of depression of the boat changes from 60 ° to 45° in 2 minutes. Find the speed of the boat in m/minutes. ($\sqrt{3}$ =1.732)
277	The height of a hill is 3300 m. From a point P on the ground the angle of elevation of the top of the hill is 60°.A balloon is moving with constant speed vertically upwards from P.After 5 minutes of its movement, a person sitting in it observes the angle of elevation of the top of the hill as 30°.What is the speed of the balloon?
278	Two tangents TP and TQ are drawn to a circle with centre 'O' from an external point .Prove that ∠PTQ = 2∠OPQ
279	Prove that the length of the tangents from an external point to a circle are equal. Using this prove the following. A quadrilateral ABCD is drawn to circumscribe a circle ,then AB + CD =AD + BC 
280	PQ is a chord of length 8 cm of a circle of radius 5 cm.The tangents drawn at P and Q intersect at T. Find the length of TP.
281	The diameters of the lower and upper ends of a bucket in the form of a frustum of a cone are 10 cm and 30 cm respectively. If its height is 24 cm, find the area of the metal sheet used to make the bucket.(Use π = 3.14)
282	A tent consists of a frustum of a cone, surmounted by a cone. If the diameter of the upper and lower

	circular ends of the frustum are 14 m and 26 m respectively. The height of the frustum is 8 m and the slant height of the surmounted conical portion is 12 m. Find the area of canvas required to make the tent.(Assume that the radii of the upper circular end of frustum and base of surmounted conical portion are equal).
283	A bucket of height 16 cm is made up of metal sheet in the form of frustum of a right circular cone with radii of its lower and upper ends as 8 cm and 20 cm respectively. Find the volume of the milk which can be filled in the bucket. Also find the cost of making the bucket when the metal sheet costs Rs.15 per 100 cm^2
284	Water is flowing at the rate of 5km/h through a pipe of diameter 14 cm in to rectangular tank, which is 50 m long and 44 m wide. Determine the time in which the level of water in the tank will rise by 7 cm.
285	A solid wooden toy is in the form of a hemisphere surmounted by a cone of same radius. The radius of the hemisphere is 3.5 cm and the total wood used in making of toy is $166\frac{5}{6}$ cm^3.Find the height of the toy .Also, find the cost of painting the hemispherical part of the toy at the rate of Rs. 10 per cm^2.
286	From a cuboidal solid metallic block of dimensions 15 cm x 10 cm x 5 cm, a cylindrical hole of diameter 7 cm and height 5cm is drilled out. Find the surface area of the remaining block.
289	Water flows out through a circular pipe whose internal radius is 1 cm, at the rate of 80 cm / second in to an empty cylindrical tank, the radius of whose base is 40 cm.By how much will the level of water rise in the tank in half an hour?
290	The $\frac{3}{4}^{th}$ part of a conical vessel of internal radius 5 cm and height 24 cm is full of water. The water is emptied in to cylindrical vessel with internal radius 10 cm.Find the height of water in the cylindrical vessel.
291	The median of the following frequency distribution is 32.5.Find the values of 'x' and 'y'.

Classes	0-10	10-20	20-30	30-40	40-50	50-60	60-70	Total
Frequency	x	5	9	12	y	3	2	40

292 Find the Median and Mode of the following data.

Classes	0-20	20-40	40-60	60-80	80-100	100-120	120-140
Frequency	6	8	10	12	6	5	3

293 The Mean of the following distribution is 18.Find the value of missing frequency 'f'.

Classes	11-13	13-15	15-17	17-19	19-21	21-23	23-25
Frequency	3	6	9	13	f	5	4

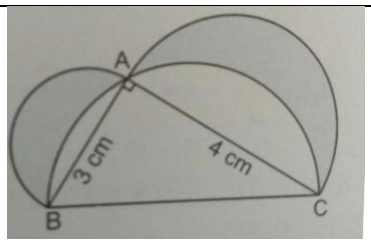
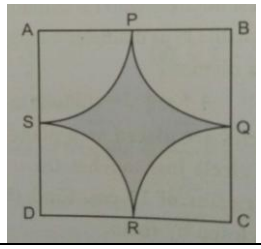
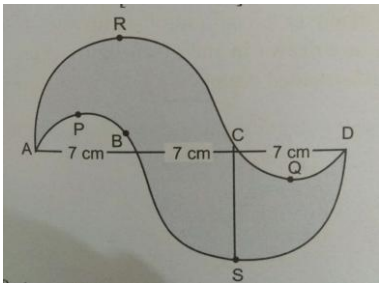
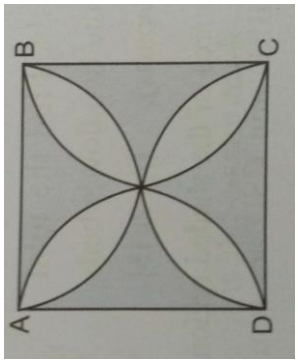
294 Draw a less tan type and a more than type ogives for the following data and hence obtain Median from it.

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
No. of students	5	3	4	3	3	4	7	9	7	8

295 Draw a more than ogive for the following data :

Marks	0-20	20-40	40-60	60-80	80-100
No. of Students	5	9	12	8	6

296 In the given figure ΔABC is right angled at A .Semicircles are drawn on AB, AC and BC as diameters. Find the area of the shaded region.

	
297	**Find the area of the shaded region in figure given below. Arcs are drawn with centers A,B,C and D intersect in pairs at midpoints P,Q,R and S of the sides AB,BC,CD and DA respectively of a square ABCD of side 12 cm.(Use π = 3.14)** 
298	**In figure APB and CQD are semicircles of diameter 7 cm each, while ARC and BSD are semicircles of diameter 14 cm each. Find the perimeter and the area of the shaded region.** 
299	**In figure ABCD is a square of side 14 cm.Semicircles are drawn with each side of square as diameter. Find the area of shaded region.** 
300	**In figure, ABC is a quadrant of a circle of radius 14 cm and a semicircle is drawn with BC as diameter. Find the area of the shaded region.**