CBSE-10th Mathematics/2022-23/Important Questions

Practice All Questions :

1) If 5 tan Θ = 4 , Find the value of : $\frac{5\,sin\theta-2\cos\theta}{5\ sin\theta+2\ cos\theta}$.
2) Prove that : $\frac{\sin\theta-2sin^3\ \theta}{2\ cos^3\theta-\cos\theta}$ = tan Θ
3) Prove that : $\frac{\tan^3\alpha}{1+\tan^2\alpha}+\frac{\cot^3\alpha}{1+\cot^2\alpha}$ = secα. Cosecα - 2 sinα cosα.
4) 7 $\sin^2$ Θ + 3 $\cos^2$ Θ = 4 then find tan Θ .
5) If ΔABC is right angled at C, then the value of Cosec (A+B) is …….
6) Find Θ , $if\ \frac{cos\,\theta-\sin\theta}{cos\,\theta+sin\,\theta}=\frac{1-\sqrt{3}}{1+\sqrt{3}}$.
7) Prove that : $\frac{(1+\cot A+\tan A)\,(\sin A-\cos A)}{\sec^3A-\operatorname{cosec}^3A}$ = $\sin^2$A $\cos^2$A.
8) ∟B & ∟Q are acute angles such that sin B = sinQ, Prove that ∟B = ∟Q.
9) Prove that : $\frac{\tan\theta}{1-cot\,\theta}+\frac{\cot\theta}{1-tan\,\theta}$ = 1 + sec Θ $Cosec\ \theta$.
10) Prove that : $\left(\frac{1}{sec^2\theta-cos^2\theta}+\frac{1}{cosec^2\theta-sin^2\theta}\right)\ sin^2\theta\ cos^2\theta=\frac{1-sin^2\theta\ cos^2\theta}{2+\ sin^2\theta\ cos^2\theta}$.
11) Prove that : (1 +cot Θ - cosec Θ) (1 + tan Θ + sec Θ) = 2 .
12) If sec Θ + tan Θ = p , Prove that : sinΘ = $\frac{p^2-1}{p^2+1}$.
13) If a sinθ + b cosθ = c, then prove that a cosθ – b sinθ = $\pm\sqrt{a^2+b^2-c^2}$
14) If sinθ + cosθ = √2, then tanθ + cot θ = (a) 1 (b) 2 (c) 3 (d) 4
15) If sin(A+B) =1 and cos(A-B)= √3/2, 0°< A+B ≤ 90° and A> B, then find the measures of angles A and B.
16) If sin Θ + $\sin^2$ Θ = 1, prove that $\cos^2$ Θ + $\cos^4$ Θ = 1.
17) 1 + $\sin^2$Θ = 3 sin Θ cos Θ, then prove that tan Θ = 1 or 1/2.
18) Sin Θ + cos Θ = √3 , then prove that tan Θ + cot Θ = 1.
19) If sinθ + cosθ = p and secθ + cosecθ = q, then prove that q (p^2 – 1) = 2p.
20) Prove that : $\frac{(\sin\theta-\cos\theta+1}{(\sin\theta+\cos\theta-1)}=\frac{1}{(\sec\theta-\tan\theta)}$.
21) Prove that : $\sqrt{\frac{\sec\theta-1}{\sec\theta+1}}+\sqrt{\frac{\sec\theta+1}{\sec\theta-1}}$ = 2 cosec Θ .
22) The angle of elevation of an airplane from a point on the ground is 60°. After a flight of 30 seconds, it is observed that the angle of elevation changes to 30°. The height of the plane remains constantly as 3000√3 m. Use the above information to answer the questions that follow-
    (i) Draw a neat labelled figure to show the above situation diagrammatically.
    (ii) What is the distance travelled by the plane in 30 seconds? OR Keeping the height constant, during the above flight, it was observed that after 15(√3 -1) seconds, the angle of elevation changed to 45°. How much is the distance travelled in that duration.
    (iii) What is the speed of the plane in km/hr.

23) The mid-points D, E, F of the sides of a triangle ABC are (3, 4), (8, 9) and (6, 7). Find the coordinates of the vertices of the triangle.
24) The two opposite vertices of a square are (–1, 2) and (3, 2). Find the coordinates of the other two vertices.
25) Find the ratio in which the line 2x + 3y – 5 = 0 divides the line segment joining the points (8, –9) and (2, 1). Also find the coordinates of the point of division.
26) The points A (2, 9), B (a, 5) and C (5, 5) are the vertices of a triangle ABC right angled at B. Find the values of a and hence the area of ΔABC.
27) Find the coordinates of the point Q on the x–axis which lies on the perpendicular bisector of the line segment joining the points A (–5, –2) and B(4, –2). Name the type of triangle formed by the points Q, A and B.

28) Find a point which is equidistant from the points A (–5, 4) and B (–1, 6)? How many such points are there?
29) If A (2,-1), B(a,0) , C(4, b) & D(1,2) are the vertices of a parallelogram, find the values of a & b .

30) Find the circumcentre of the triangle whose vertices are (-2 , -3) , (-1 , 0) & (7 , -6).

31) If A (5 ,-1) , B(- 3 , -2) , & C (-1 ,8) are the vertices of triangle ABC , find the length of median through A & the coordinates of the Centriod .

32) If A and B are (– 2, – 2) and (2, – 4), respectively, find the coordinates of P such that AP = 3/7(AB) and P lies on the line segment AB.

33) The fourth vertex D of a parallelogram ABCD whose three vertices are A (–2, 3), B (6, 7) and C (8, 3) is
(A) (0, 1) (B) (0, –1) (C) (–1, 0) (D) (1, 0)

34) If the point P(x, y) is equidistant from the points A(a + b, b – a) and B(a – b, a + b). Prove that bx = ay.

35) The point which divides the line segment joining the points (7, –6) and (3, 4) in ratio 1 : 2 internally lies in the
(A) I quadrant (B) II quadrant (C) III quadrant (D) IV quadrant.

36) The distance of the point P (–6, 8) from the y- axis is…….

37) The line segment joining the points A (3, 2) and B (5,1) is divided at the point P in the ratio 1:2 and it lies on the line 3x – 18y + k = 0. Find the value of k.

38) Find the 11th term from the last term of the AP : 10, 7, 4, . . ., – 62.

39) Find a point which is equidistant from the points A (–5, 4) and B (–1, 6)? How many such points are there? Justify.

40) Which term of Progression 20 , $19\frac{1}{4}$, $18\frac{1}{2}$, $17\frac{3}{4}$,……is first negative term ?

41) How many terms of the AP: –15, –13, –11,--- are needed to make the sum –55? Explain the double answer.

42) In an AP, if $S_n = 3n^2 + 5n$ and $a_k = 164$, find the value of k.

43) If the nth terms of the two APs: 9, 7, 5, ... and 24, 21, 18,... are the same, find the value of n. Also find that term.

44) Find the sum of those integers from 1 to 500 which are multiples of 2 or 5. OR
Solve the equation – 4 + (–1) + 2 +...+ x = 437.

45) In an AP of 50 terms, the sum of first 10 terms is 210 and the sum of its last 15 terms is 2565. Find the AP.

46) If pth term of an AP is $\frac{1}{q}$ & the qth is $\frac{1}{p}$ .Show that the sum of pq terms is $\frac{1}{2}(pq + 1)$.

47) 200 logs are stacked in the following manner: 20 logs in the bottom row, 19 in the next row, 18 in the row next to it and so on . In how may rows are the 200 logs placed and how many logs are in the top row?
OR
Find the middle term of sequence formed by all three digit numbers which leave a remainder 3 , when divided by 4.

48) If Sum of first m terms of an AP is n & sum of first n terms is m, then show that the $S_{(m+n)} = -(m+n)$. OR
If the term of m terms of an A.P. is the same as the sum of its n terms, show that the $S_{(m+n)} = 0$

49) Does there exist a quadratic equation whose coefficients are all distinct irrationals but both the roots are rationals? Why?

50) Two water taps together can fill a tank in 9 hours 36 minutes. The tap of larger diameter takes 8 hours less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank.For what value of m will the equation $x^2 - 2x(1+3m) + 7(3+2m) = 0$ will have equal roots

51) A pole has to be erected at a point on the boundary of a circular park of diameter 17 m in such a way that the differences of its distances from two diametrically opposite fixed gates A and B on the boundary is 7 metres. Find the distances from the two gates where the pole is to be erected.

52) Solve the equation : i) $2^{2x+3} = 65(2^x - 2) + 122$ ii) $\frac{x-4}{x-5} + \frac{x-6}{x-7} = \frac{10}{3}$

53) If roots of the quadratic equation $x^2 + 2px + mn = 0$ are real and equal, show that the roots of the quadratic equation $x^2 - 2(m + n)x + (m^2 + n^2 + 2p^2) = 0$ are also equal.

54) The denominator of a fraction is one more than twice its numerator. If the sum of the fraction and its reciprocal 2 $\frac{16}{21}$ find the fraction.

55) In a flight of 2800 km, an aircraft was slowed down due to bad weather. Its average speed is reduced by 100 km/h and time increased by 30 minutes. Find the original duration of the flight.

56) Find the value of p for which the quadratic equation $(2p + 1)x^2 - (7p + 2)x + (7p - 3) = 0$ has equal roots. Also find these roots.

57) If difference of two numbers is 3 & difference of their reciprocals is 3/28 . Find the numbers.

58) The total cost of a certain length of a piece of cloth is Rs 200. If the piece was 5 m longer and each metre of cloth costs 2 less, the cost of the piece would have remained unchanged. How long is the piece and what is its original rate per metre ?

59) Solve: i) $2\left(\frac{x+2}{2x-3}\right) - 9\left(\frac{2x-3}{x+2}\right) = 3$ ii) $ab\,x^2 = (a+b)^2\,(x-1)$ iii) $\frac{1}{2a+b+2x} = \frac{1}{2a} + \frac{1}{b} + \frac{1}{2x}$

60) From given data , median of data is 90, Find a.

X	0-25	25-50	50-75	75-100	100-125	125-150	150-175
F	4	8	a	15	10	7	5

61) Find the Mean , Median & Mode for the following data :

Classes	0 -10	10 -20	20 – 30	30 - 40	40 – 50	50 - 60	60 – 70
Frequency	5	8	15	20	14	8	5

62) Mean of following frequency distribution table is 65.6, Find Missing frequencies .

Class	10-30	30-50	50-70	70- 90	90-110	110-130	Total
Frequency	5	8	X	20	y	2	50

63) Determine x from the following data , when Mode is 67.

Class	40-50	50-60	60-70	70-80	80-90
Frequency	5	x	15	12	7

64) The median of the data is 52.5 , Find the values x & y , If the total frequency is 100.

C.I	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Frequency	2	5	x	12	17	20	y	9	7	4

65) If $u_i = \frac{x_i - 25}{10}$, $\sum(f_i u_i) = 20$, $\sum(f_i) = 100$, Find the Mean .

66) The table below shows the salaries of 280 persons:

Salary(thousand)	5- 10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50
No. of person	49	133	63	15	6	7	4	2	1

Calculate the median salary of the data.

67) If X , M and Z are denoting mean, median and mode of a data and X: M = 9 : 8, then the ratio M: Z is
(a) 3 : 4 (b) 4 : 9 (c) 4 : 3 (d) 2 : 5

68) The mean of n observations is $\bar{x}$,If the first observation is increased by 1,second by 2, …….& so on , Find new Mean .

69) If the difference of Mode and Median of a data is 24, then the difference of median and mean is …..

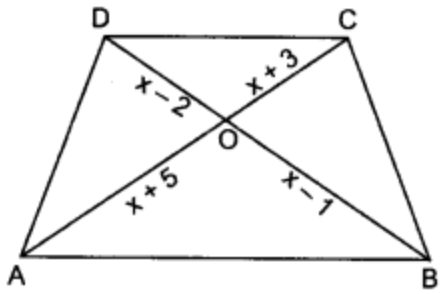
70) Two dice are thrown together. Find the probability that :
- i) P(a multiple of 2 on one die or a multiple of 3 on other die
- ii) P(getting sum as a composite number)
- iii) P(Getting 5 at least once)
- iv) P(product of the numbers on the top of the dice less than 20)

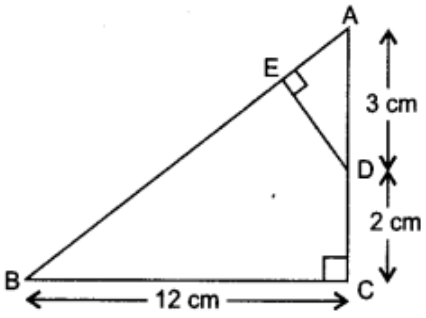
71) State & prove Basic Proportionality Theorem.

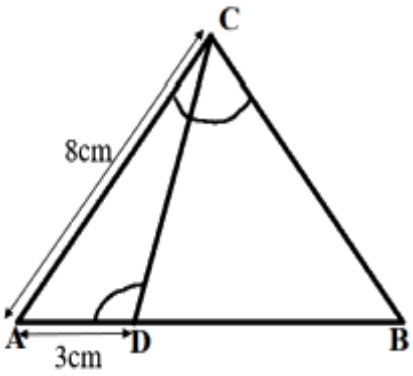
72) The diagonals of a quadrilateral ABCD intersect each other at point O such that AO/BO = CO/DO . Show that ABCD is a trapezium .

73) A vertical pole 6 m long casts a shadow of length 3.6 m on the ground. What is the height of a tower which casts a shadow of length 18m at the same time? (A) 10.8 m (B) 28.8 m (C) 32.4 m (D) 30 m

74) In the given figure, if AB || DC, find the value of x.







75) In figure, Triangle ABC is right angled at C and DE ⊥ AB. Prove that ΔABC ~ ΔADE and hence find the lengths of AE and DE .

76) In the given figure, ∠ACB = ∠CDA, AC = 8cm, AD = 3cm, then BD is ……

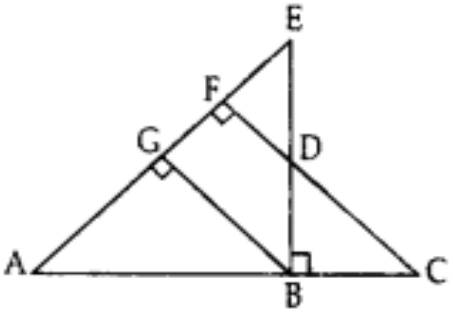
77) In triangles ABC and DEF, ∠B = ∠E, ∠F = ∠C and AB = 3 DE. Then, the two triangles are
(A) congruent but not similar (B) similar but not congruent
(C) neither congruent nor similar (D) congruent as well as similar

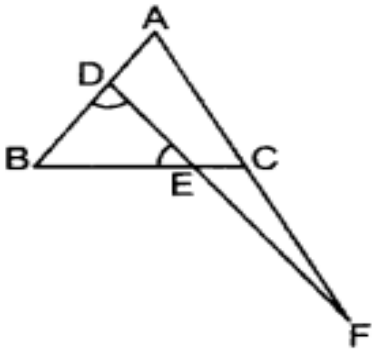
78) Sides AB and BE of a right triangle, right angled at B are of lengths 16 cm and 8 cm respectively. Find the length of the side of largest square FDGB that can be inscribed in the triangle ABE.

79) A vertical pole of length 8 m casts a shadow 6 cm long on the ground and at the same time a tower casts a shadow 30 m long. Find the height of tower.

80) In given figure, EB ⊥ AC, BG ⊥ AE and CF ⊥ AE Prove that : (a) ΔABG ~ ΔDCB(b) BC/BD=BE/BA

81) In figure, ∠BED = ∠BDE & E divides BC in the ratio 2 : 1. Prove that AF × BE = 2 AD × CF.





82) A girl of height 90 cm is walking away from the base of a lamp-post at a speed of 1.2 m/s. If the lamp is 3.6 m above the ground, find the length of her shadow after 4 seconds.

83) If the perimeters of two similar triangles ABC and DEF are 50 cm and 70 cm respectively and one side of ΔABC = 20 cm, then find the corresponding side of ΔDEF.

84) Sides AB and BC and median AD of a triangle ABC are respectively proportional to sides PQ and QR and median PM of Δ PQR .Show that Δ ABC ~ Δ PQR.

85) If AD and PM are medians of triangles ABC and PQR, respectively where Δ ABC ~ Δ PQR, prove that AB/PQ =AD/PM.

86) If $\sqrt{3}$ is an irrational number , Prove that $5 - 2\sqrt{3}$ is an irrational number

87) Bells toll together at 9.00 am. They toll after 7, 8, 11 and 12 seconds respectively. How many times will they toll together again in the next 3 hours?
A) 3 B) 4 C) 5 D)6

88) The ratio of LCM and HCF of the least composite and the least prime numbers is
A) 1:2 B) 2:1 C) 1:1 D)1:3

89) Let a and b be two positive integers such that a = $p^3 q^4$ and b = $p^5 q^3$, where p and q are prime numbers. If HCF(a,b) = $p^m q^n$ and LCM(a,b) = $p^r q^s$, then (m+n)(r+s) =…

90) Given that H.C.F. (306, 657) = 9, find L.C.M. (306, 657)

91) What can you say about the product and sum of two different irrational numbers , justify with examples.

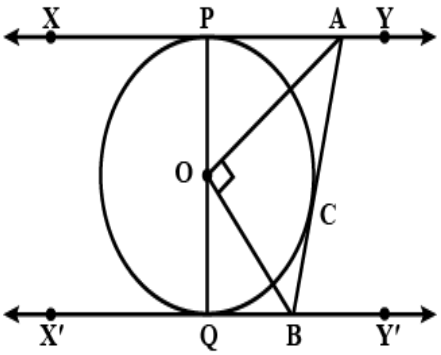
92) From an external point P , two tangents PT & PS are drawn to a circle with centre O & Radius r. If OP = 2r, Show that ∟OTS = ∟OST = 30°.

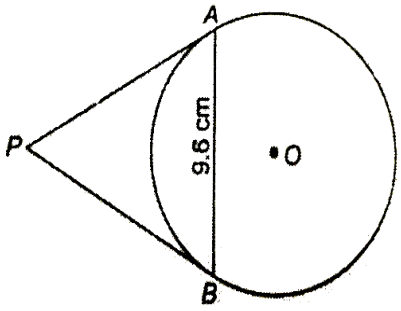
93) Prove that the parallelogram circumscribing a circle is a rhombus.

94) Show that opposite sides of quadrilateral circumscribe a circle make supplementry angles at the centre of the circle.

95) In the figure XY and X'Y' are two parallel tangents to a circle with centre O and and another tangent AB with point of contact C interesting XY at A and X'Y' at B prove that ∠AOB=90^0.

96) Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that ∠ PTQ = 2 ∠ OPQ.





97) In the following figure, AB is a chord of length 9.6 cm of a circle with centre O and radius 6 cm. find PA.

98) Prove that tangent drawn at any point of the circle is perpendicular to radius through point of contact .

99) Prove that the perpendicular at the point of contact to the tangent to a circle passes through the centre.

100) AB is a diameter and AC is a chord of a circle with centre O such that ∠BAC = 30°. The tangent at C intersects extended AB at a point D. Prove that BC = BD.

101) The wheel of a cart is making 5 revolutions per second. If the diameter of the wheel is 84 cm, find its speed in km/hr. Give your answer, correct to nearest km.

102) The diameter of the driving wheel of a bus is 140 cm. How many revolutions must the wheel make in order to keep a speed of 66 km/hr?

103) A bucket is raised from a well by means of a rope which is wound round a wheel of diameter 77 cm. Given that the bucket ascends in 1 min. 28 seconds with a uniform speed of 1·1 m / sec, calculate the number of complete revolutions the wheel makes in raising the bucket.

104) The minute hand of a clock is 10.5 cm long. Find the area swept by it in 15 minutes.

105) The cost of fencing a circular field at the rate of Rs. 24per metre is Rs. 5280. Then the cost of ploughing the field, at the rate of 50 paise/m^2, is…….

106) A copper wire when bent in the form of an equilateral triangle has an area of 121 cm^2. If the same wire is bent into the form of a circle, find the area enclosed by the wire.

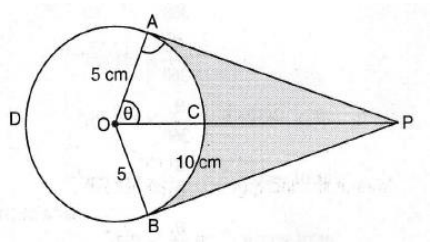
107) The sum of the radii of two circles is 140 cm and the difference of their circumferences is 88 cm. Find the radii of the two circles.

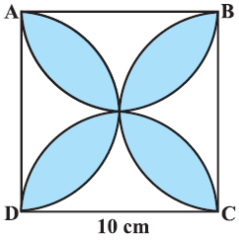
108) An elastic belt is placed around the rim of a pulley of radius 5 cm. (Fig. 10) From one-point C on the belt, the elastic belt is pulled directly away from the center O of the pulley until it is at P, 10 cm from the point O. Find the length of belt that is still in contact with the pulley.

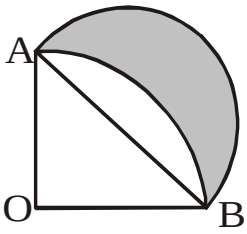
109) Find the area of the shaded design,, where ABCD is a square of side 10 cm and semicircles are drawn with each side of the square as diameter.

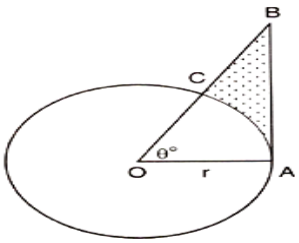
110) In the fig., ABC is a quadrant of a circle of radius 14 cm and a semi-circle is drawn with BC as diameter. Find the area of the shaded region.

111) A sector of circle centre O Containing an angle Θ° .Prove that perimeter of the shaded region is r(tan Θ +sec Θ + $\pi \frac{\theta}{180}$ - 1) and area of the shaded region is $\frac{r^2}{2}$ (tan Θ - $\pi \frac{\theta}{180}$).









112) An arc of a circle is of length 5π cm and the sector it bounds has an area of 20 π cm^2. Find the radius of the circle.

113) The perimeter of the certain sector of a circle of radius 5.2 cm is 16.4 cm. Find the area of the sector .

114) Area of a sector of central angle 200° of a circle is 770 cm^2. Find the length of the corresponding arc of this sector.

115) Area of a sector of a circle of radius 36 cm is 54 π cm^2. Find the length of the corresponding arc of the sector.

116) The diameters of the wheels of the bus is 140 cm . How many revolutions per minute do the wheels make when the bus is moving at a speed of 72.6 km per hour?

117) The radii of two circles are 8 cm and 6 cm respectively. Find the radius of the circle having area equal to the sum of the areas of the two circles.

118) A wheel makes 1000 revolutions in covering a distance of 88 km. Find the radius of the wheel.

119) The minute hand of a clock is 21 cm long. Find the area described by the minute hand on the face of the clock between 7:00 am and 7: 35 am.

120) In a circle of radius 21 cm, an arc subtends an angle of 60º at the centre. Find: (i) length of the arc (ii)area of the sector formed by the arc (iii) area of the segment formed by the corresponding chord of the arc.

121) A chord of a circle of radius 12 cm subtends an angle 120® at the centre . Find the area of the corresponding segment of the circle . [Use pi = 3.14 & $\sqrt{3}$ = 1.73]

122) The diameters of the wheels of the bus is 140 cm . How many revolutions per minute do the wheels make when the bus is moving at a speed of 72.6 km per hour?

123) If the system of equations 3x+y =1 and (2k-1)x +(k-1)y =2k+1 is inconsistent, then k =

124) If two tangents inclined at an angle of 60º are drawn to a circle of radius 3cm, then the length of each tangent is equal to….

125) ABCD is a trapezium with AD ‖ BC and AD = 4cm. If the diagonals AC and BD intersect each other at O such that AO/OC = DO/OB =1/2, then BC = ……

126) If 49x+51y= 499, 51 x+49 y= 501, then find the value of x and y.

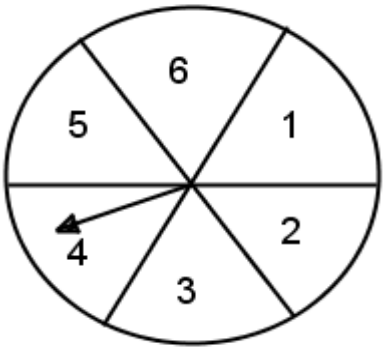
127) A train covered a certain distance at a uniform speed. If the train would have been 6 km/h faster, it would have taken 4 hours lessthan the scheduled time. And, if the train were slower by 6 km/hr ; it would have taken 6 hours more than the scheduled time. Find the length of the journey.

128) To fill a swimming pool two pipes are used. If the pipe of larger diameter used for 4 hours and the pipe of smaller diameter for 9 hours, only half of the pool can be filled. Find, how long it would take for each pipe to fill the pool separately, if the pipe of smaller diameter takes 10 hours more than the pipe of larger diameter to fill the pool?

129) Due to heavy floods in a state, thousands were rendered homeless. 50 schools collectively decided to provide place and the canvas for 1500 tents and share the whole expenditure equally. The lower part of each tent is cylindrical with base radius 2.8 m and height 3.5 m and the upper part is conical with the same base radius, but of height 2.1 m. If the canvas used to make the tents costs ₹120 per m^2 , find the amount shared by each school to set up the tents.

130) There are two identical solid cubical boxes of side 7cm. From the top face of the first cube a hemisphere of diameter equal to the side of the cube is scooped out. This hemisphere is inverted and placed on the top of the second cube's surface to form a dome. Find (i) the ratio of the total surface area of the two new solids formed (ii) volume of each new solid formed.

131) In Figure a disc on which a player spins an arrow twice. The fraction a/b is formed, where a is the number of sector on which arrow stops on the first spin and 'b' is the number of the sector in which the arrow stops on second spin, On each spin, each sector has equal chance of selection by the arrow. What is the probability that the fraction a/b > 1.



132) A bag contains 20 balls out of which x balls are red. (i) If one ball is drawn at random from the bag, find the probability that it is not red. (ii) If 4 more red balls are put into the bag, the probability of drawing a red ball will be 5/4 times the probability of drawing a red ball in the first case. Find the value of x.

133) In a game, the entry fee is Rs 5. The game consists of a tossing a coin 3 times. If one or two heads show, Shweta her entry fee back. If she throws 3 heads, she receives double the entry fees. Otherwise she will lose. For tossing a coin three times, find the probability that she (i) loses the entry fee. (ii) gets double entry fee. (iii) just gets her entry fee.

134) If squared difference of the zeroes of the polynomial $x^2 + ax + 45$ is equal to 144, find the value of a .

135) If α and β are zeroes of the quadratic polynomial $kx^2 + 4x + 4$ such that $\alpha^2 + \beta^2 = 24$, find the value of k .

136) If α & β are zeroes of the polynomial $p(x) = x^2 - 4x + 2$, then find the value of $(\alpha + 1)^{-2} + (\beta + 1)^{-2}$.

137) If α & β are the zeroes of the polynomial $3x^2 + kx + 3$ & $\alpha^2 + \beta^2 + \alpha\beta = 21/4$, then find the value of k .

138) If the zeroes of $x^2 + px + q$ are the two consecutive integers , then $p^2 - 1 = 4q$.

139) If one zero of polynomial $39y^2 - (2k+1)y - 22$ is negative of the other , Find the value of k.

140) What can you say about the zeros of quadratic polynomial : $x^2 + kx + k$, $k \neq 0$ a) can't Both +ve b) can't both –ve c) not determined d) always unequal

141) The number of polynomials having zeroes as –2 and 5 is……(ALL)

142) The zeroes of the quadratic polynomial $x^2 + 100x + 657$ are
(A) both positive (B) both negative (C) one positive and one negative (D) both equal

143) Find the quadratic Polynomial whose zeroes are reciprocals of zeroes of Polynomial $f(x) = ax^2 + bx + c$, where $a \neq 0$, $b \neq 0$. (1)

144) If α & β are the zeroes of the quadratic polynomial $f(x) = 3x^2 - 4x + 1$, find quadratic polynomial whose zeroes are $\frac{\alpha}{\beta}$ & $\frac{\beta}{\alpha}$. (2)

145) A teacher told 10 students to write a polynomial on the black board. Students wrote (3)

1. $x^2 + 2$ 2. $2x + 3$ 3. $x^3 + \sqrt{2x} + 1$ 4. $x^3 + 2x^2 + 1$

5. $2x^2 + 3 + \frac{7}{x}$ 6. $x - \frac{1}{x}$ 7. $x^4 + x^2 + 1$ 8. $x^2 + 2x + 1$

9. $5x - \frac{1}{4}$ 10. $3x^3 + 2x^4 + 1 - x$ 11. $\frac{x^{5/2} - \sqrt{x}}{\sqrt{x}}$

How many of above are not polynomials (ii) How many are Cubic polynomials.

146) Places A and B are 100 km apart on a highway. One car starts from A and another from B at the same time. If the cars travel in the same direction at different speeds, they meet in 5 hours. If they travel towards each other, they meet in 1 hour. What are the speeds of the two cars?

147) Find the zeros of quadratic polynomials and verify the relationship between the zeros and their coefficients: i) $6x^2 - 3 - 7x$ ii) $4x^2 + 6x$ iii) $4x^2 + 5\sqrt{2}x - 3$

148) Two vertical poles of different heights are standing 20m away from each other on the level ground. The angle of elevation of the top of the first pole from the foot of the second pole is 60° and angle of elevation of the top of the second pole from the foot of the first pole is 30°. Find the difference between the heights of two poles. (Take $\sqrt{3} = 1.73$)

149) Trigonometry in the form of triangulation forms the basis of navigation, whether it is by land, sea or air. GPS a radio navigation system helps to locate our position on earth with the help of satellites. A guard, stationed at the top of a 240m tower, observed an unidentified boat coming towards it. A clinometer or inclinometer is an instrument used for measuring angles or slopes(tilt). The guard used the clinometer to measure the angle of depression of the boat coming towards the lighthouse and found it to be 30°.

i) Make a labelled figure on the basis of the given information and calculate the distance of the boat from the foot of the observation tower.

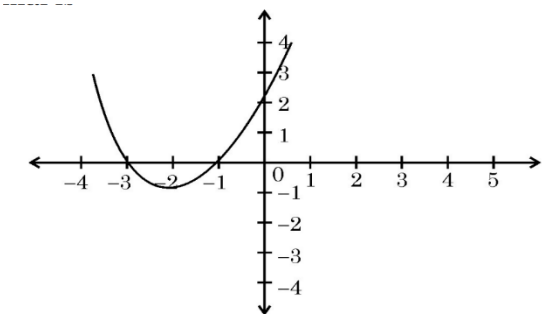
ii) After 10 minutes, the guard observed that the boat was approaching the tower and its distance from tower is reduced by 240(√3 - 1) m. He immediately raised the alarm. What was the new angle of depression of the boat from the top of the observation tower?

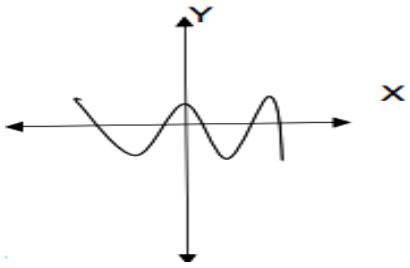
150) Push-ups are a fast and effective exercise for building strength. These are helpful in almost all sports including athletics. While the push-up primarily targets the muscles of the chest, arms, and shoulders, support required from other muscles helps in toning up the whole body. Nitesh wants to participate in the push-up challenge. He can currently make 3000 push-ups in one hour. But he wants to achieve a target of 3900 push-ups in 1 hour for which he practices regularly. With each day of practice, he is able to make 5 more push-ups in one hour as compared to the previous day. If on first day of practice he makes 3000 push-ups and continues to practice regularly till his target is achieved. Keeping the above situation in mind answer the following questions:

i) Form an A.P representing the number of push-ups per day and hence find the minimum number of days he needs to practice before the day his goal is accomplished?

ii) Find the total number of push-ups performed by Nitesh up to the day his goal is achieved.

151) The number of zeroes for a polynomial p(x) where graph of y = p(x) is





Hence Write Equation of Polynomial for first Figure.