CBSE-X-MATHS

MATHEMATICS-1

Time-3hours **Max.Marks-100**

Section A (3 Marks-each)

Question-1

Solve for X and Y

$$(a-b)x+(a+b)y=a^2-2ab-b^2$$
$$(a+b)(x+y)=a^2+b^2$$

Or,

A two-digit number is 3 more than 4 times the sum of its digits. If 18 is added to the numbers, the digits are reversed. Find the number.

Question-2

If -5 is a root of the quadratic equation $2x^2+px-15=0$ and the quadratic equation $p(x2+x)+k=0$ has equal roots, find the value of K.

Question-3

The LCM and GCD of two polynomials, $P(x)$ and $Q(x)$ are $56(x^4+x)$ and $4(x^2-x+1)$ respectively. If $P(x)=28(x^3+1),$ find $Q(x)$.

Or,

If $x-b$ is GCD of x^2-x-12 and $x^2-2x-8,$ find the value of $b.$

Question-4

Simplify:

$$\frac{m^2+7m+10}{m^2-10m+24}\times\frac{m^2-7m+12}{m^2-2m+35}\div\frac{m^2-m-6}{m^2-13+42}$$

Question-5

The 7th term of an $A.P.$ is 20 and its 13th term is 32. find the $A.P.$

Queston-6

A radio is available for $Rs.1500$ cash or $Rs.300$ as cash down payment followed by three equal monthly instalments of $Rs.420$. Find the rate of interest charged under the instalment scheme.

Question-7

Find the sum of the first 25 terms of an $A.P.$ whose nth term is given by $t_n=7-3n.$

Question-8

In fig-1, $DE \parallel BC$ and $AD : DB = 5.4,$

Find $\dfrac{ar(\Delta DFE)}{ar(\Delta CFB)}$

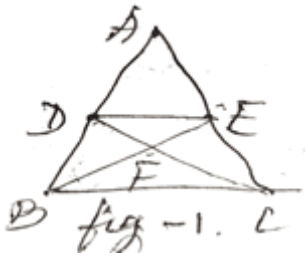


fig-1.

Question-9

A loan of $Rs.6{,}300$ is to be returned in two equal annual instalment. If the rate of interest is $Rs.10\%$ per annum, compounded annually, calculate the amount of each instalment.

Question-10

In fig-2, O is the centre of the circle.

$\angle PAB = 20^0, \angle OCB = 55^0.$ find $\angle BOC$ and $\angle AOC.$

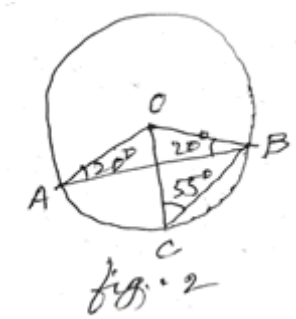


fig. 2

Section-B (4 marks each)

Question-11

Determine graphically the co-ordinates of the vertices of the triangle, the equation of whose sides are:

$y = x; \quad 3y = x; \quad x + y = 8$

Question-12

Solve for x :

$$2\left(\frac{x-2}{x+3}\right) - 7\left(\frac{x+3}{x-1}\right) = 5; \quad \text{where } x \neq -3, x \neq 1.$$

Queston-13

A toy is in the form of a cone mounted on a hemisphere of radius 3.5cm. the total height of the toy is 15.5cm. find the total surface area and volume of the toy. $Take \pi = 22/7$

Question-14

If $\tan\theta = \frac{4}{5}$, find the value of

$$\frac{2\sin\theta - 3los\theta}{4\sin\theta - 9los\theta}$$

without using tables, evaluate

$$\sec^2 10^0 - lot^2 80^0 + \frac{\sin 15^0 los 75^0 + los 15^0 \sin 75^0}{los\theta \sin(90^0 - \theta) + \sin los(90^0 - \theta)}$$

Queston-15

Construct a triangle ABC in which $BC = 5.6cm, \angle A = 60^0$ and median through A is $4.5cm$ and state the steps of construction.

Question-16

Show that the points $A(2,-2), B(14,10), C(11,13)$ and $D(-1,1)$ are the vertices of a rectangle.

Question-17

The co-ordinates of the mid-point of the line joining the points $(3P,4)$ and $(-2, 2q)$ are $(5, P).$ find the value of P and Q.

Or,

Find the co-ordinates of the ceutroid of a triangle ABC, with vertices $A(x_{1.} y_1), B(x_2 y_2)$ and $C(x_3 y_3).$

Question-18

The mean of the following frequency table is 50. but the frequencies F_1 and F_2 in class 20-40 and 60-80 are missing.

Find the missing frequencies.

Class interval	0-20	20-40	40-60	60-80	80-10	Total
Frequency	17	F_1	32	F_2	19	120

Question-19

One card is drawn from a pack of 52 cards, each of the 52 cards being equally likely to be drawn. Find the probability that the card drawn is
(i) red (ii) king (iii) Ace (iv) red and queen.

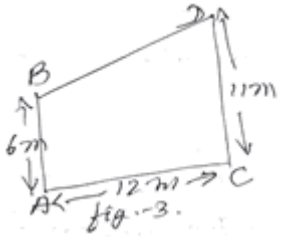
Question-20
In a month, a house holder spent his salary amounting to $Rs.7,200$ on different items given below. Represent the information in the form of a pie-chart.

Items	Clothing	Food	House rent	Education	Misc.
Amount	600	4,000	1,200	400	1,000

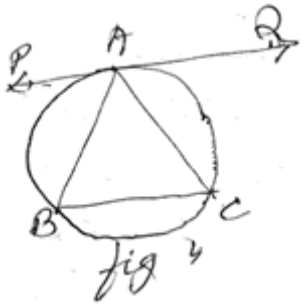
Section-C (6 marks each)

Question-21
In a right triangle, prove that the square on the hypotenuse is equal to the sum of the squares on the other two sides. Using above, the following:

In figure-3, find the length of BD, if $AB \perp A$ and $CD \perp AC.$

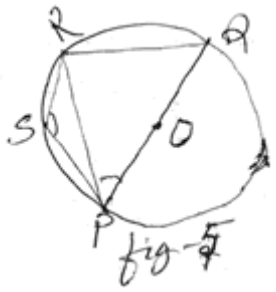


Question-22
If a chord is drawn through the point of contact of a tangent to a circle, then the angle which this chord makes with the given tangent are equal respectively to the angles formed in the corresponding alternate segment. Prove.



Using above theorem, prove the following:

In $\Delta ABC, AB = AC$ and PAQ is a tangent to the circum circle of ΔABC at the point $A.$ prove that PAQ is parallel to $BC.$ (see fig-4).



Or,

Prove that the sum of either pair of opposite angles of a cyclic quadrilateral is 80º. Using above, solve the following: In fig-5, POQ is a diameter and $PQRS$ is a Cyclic quadrilateral. If $\angle PSR = 150$º, find $\angle RPQ$

Question-23

If the angle of evation of a cloud from a point h meter above a lake is α and the angle of depression of its reflection in the lake is β. prove that the height of the cloud is $\frac{h(\tan\beta + \tan\alpha)}{(\tan\beta - \tan\alpha)}$.

Or,

The height of a house snbtends a right angle at the opposite window. The angle of elevation of the window from the base of the house is 60º. If the width of the road is 6m, find the height of the hones.

Question-24

If the radio of circular ends of a conical bucket, which is 45cm high, are 28cm and 7cm, find the capacity and total surface area of the bucket. $(USE\ \pi = \frac{22}{7})$

Question-25

Sohan, 67yrs old, earns $Rs.21{,}000$ per month. He donates $Rs.6{,}000$ to the P.M. relief fund (100% relief) and $Rs.4{,}000$ to an educational institution (50% relief). He contributes $Rs.60{,}000$ towards PPF and purchases NSC worth $RS.15.000.$ he pays income tax of $Rs.550$ per month for the first 11month of the year. Find the income tax to be paid by him in the last month of the year.