Contd: STD: X Maths Prelium Paper Dec 2007-Jan.-2008.
Q4.a) If $\mathrm{A}=\left(\begin{array}{rr}1 & 2 \\ -2 & 3\end{array}\right)$,
$B=\left[\begin{array}{ll}2 & 1 \\ 3 & 2\end{array}\right]$ And $C=\left(\begin{array}{ll}1, & 3 \\ 3 & ,\end{array}\right]$, find $C(B-A)$
b) If $3 \tan ^{2} \mathrm{~A}-1=0$ then show that :-

$$
\begin{equation*}
\operatorname{Cos} 3 A=4 \operatorname{Cos}^{3} A-3 \operatorname{Cos} A . \tag{4}
\end{equation*}
$$

c) A plot of land has an area of $4,00,000 \mathrm{~m}^{2}$. It is represented on the map by an area
of $40 \mathrm{~cm}^{2}$ Find:
i) The scale factor of the map
ii) What distance on the map would a distance of 2.4 km .

## SECTION B ( 40 MARKS)

Q5.a) Show that $\sqrt{\frac{1-\operatorname{Cos} A}{1+\cos A}}=\underline{\operatorname{Sin} A}$
b)


In the given your answer.
c) The equation of a line is $2 x-2 \sqrt{3} y-\sqrt{3}=0$. Find:ACB $+L$
i) The gradient of the line
ii) The inclination of the line
iii) The $y$ intercept of the line

Q6.a) AN open cylindrical vessel of internal diameter of 49 cm . and height 64 cm . stands
On a horizontal platform. Inside this is placed a solid metallic right circular cone volume of water required to fill the tank. (Take $\Pi=\underline{22}$ ) ${ }^{1 / 2} \mathrm{~cm}$. Calculate the
b) The perimeter of a rectangular plot is 180 m length is xm , express the breadth in terms of x . Hence is $1800 \mathrm{~m}^{2}$. If the Solve the equation to find length and breadth of the rectangle an equation in $x$.
c) Find the H.C.F. and L.C.M. of $x^{2}-25$ breadth of the rectangle.
$2 x-35$ and $x^{2}-12 x+35$
Q7 a) Solve by factorizing :-
b) Simple interest on a certain $24 x^{2}+135=0$
compound interest on the same sum for 3 yer 4 years at $4 \%$ p.a. exceeds the sum..

Contd: STD: X Maths Prelium Paper Dec 2007-Jan.-2008.
Q4.a) If $\mathrm{A}=\left(\begin{array}{rr}1 & 2 \\ -2 & 3\end{array}\right), \quad \mathrm{B}=\left(\begin{array}{ll}2 & 1 \\ 3 & 2\end{array}\right)$
And $C=\left(\begin{array}{lll}1 & , & 3 \\ 3 & , & 1\end{array}\right)$, find $C(B-A)$
b) If $3 \tan ^{2} \mathrm{~A}-1=0$ then show that :-
$\operatorname{Cos} 3 \mathrm{~A}=4 \operatorname{Cos}^{3} \mathrm{~A}-3 \operatorname{Cos} \mathrm{~A}$.
c) A plot of land has an area of $4,00,000 \mathrm{~m}^{2}$. It is represented on the map by an area
of $40 \mathrm{~cm}^{2}$. Find:
i) The scale factor of the map
ii) What distance on the map would a distance of 2.4 km .

## SECTION B (40 MARKS)

Q5.a) Show that $\sqrt{\frac{1-\operatorname{Cos} A}{1+\cos A}}=\underline{\operatorname{Sin} A}$
b)

$$
\begin{equation*}
\sqrt{1+\operatorname{Cos} A \quad 1+\operatorname{Cos} A} \tag{3}
\end{equation*}
$$

In the given figure write down the measure of $\lfloor\angle A C B+\angle A D B$ and justify
your answer.
(3)
c) The equation of a line is $2 x-2 \sqrt{3} y-\sqrt{3}=0$. Find:-
i) The gradient of the line
ii) The inclination of the line
iii) The $y$ intercept of the line

Q6.a) AN open cylindrical vessel of internal diameter of 49 cm . and height 64 cm . stands On a horizontal platform. Inside this is placed a solid metallic right circular cone whose base has a diameter of $101 / 2 \mathrm{~cm}$. and whose height is 12 cm . Calculate the volume of water required to fill the tank. (Take $\Pi=\frac{22}{7}$ )
b) The perimeter of a rectangular plot is 180 m and its area is $1800 \mathrm{~m}^{2}$. If the length is xm , express the breadth in terms of x . Hence, form an equation in x .
Solve the equation to find length and breadth of the rectangle.
Find the H.C.F and
c) Find the H.C.F. and L.C.M. of $x^{2}-25, x^{2}-2 x-35$ and $x^{2}-12 x+35$

Q7 a) Solve by factorizing :-

$$
\begin{equation*}
24 x^{2}-334 x+135=0 \tag{2}
\end{equation*}
$$

b) Simple interest on a certain sum of money for 4 years at $4 \%$ p.a. exceeds the compound interest on the same sum for 3 years at $5 \%$ p.a. by Rs. 228 . Find the
sum..

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c) The line joining $A(-3,4)$ and $b(a, 9)$ is divided in the ratio $2: 3$ at $P$. the point where line segment $A B$ intersects $Y$-axis. Calculate.
i) the value of a
ii) the co-ordinates of P .

Q8.a) A saving bank account, was opened by a man on 3.7.03 and closed on 31.12.03. Entries are given below:-

| Date | Particulers | Debit (Rs.) | Credit (Rs.) | Balance (Rs.) |
| :--- | :--- | :---: | :---: | :---: |
| 03.07 .03 | By Cash | - | 700 |  |
| 15.07 .03 | $"$ | - | 1200 |  |
| 28.08 .03 | $"$ | - | 2500 |  |
| 30.08 .03 | To Cash | 1000 | - |  |
| 12.09 .03 | To Cheque | 800 | - |  |
| 20.11 .03 | By Cheque | - | 3000 |  |
| 26.11 .03 | By Cash | - | 750 |  |
| 28.11 .03 | To Cash | 1500 | - |  |
|  |  |  |  |  |

By finding the balance on different entries, calculate the interest if $R=6 \% \mathrm{p} . a$.
Also find the amount he gets on day of closing.
b) Draw a line $\mathrm{AB}=8 \mathrm{~cm}$.
i) Draw and describe the locus of point which is always 4 cm . from line $A B$.
ii) Equidistant from A and B
ii) Mark the two points X and Y which are 4 cm . from AB and equidistant from A
and $B$ and describe figure AXBY.
Q9.a) Use a graph paper. The graph of a linear equation in $x$ and $y$ passes through $P$ $(1,-1)$ and $Q(2,5)$. From your graph, find the value of $a$ and $b$, if the line passes through ( $\mathrm{a}, 4$ ) and $\left(\frac{1}{2}, \mathrm{~b}\right)$
b) Using a graph paper, draw an ogive for the following distribution which shows a record of the weight in Kgms of 200 students.
$\begin{array}{lccccccccc}\text { Weight - } 30-35 & 35-40 & 40-45 & 45-50 & 50-55 & 55-60 & 50-65 & 65-70 \\ \text { Frequency } & 5 & 15 & 24 & 44 & 50 & 31 & 20 & 11\end{array}$
Use your ogive to estimate:-
i) The percentage of students weighing 45 kg or more
ii) The weight above which the heaviest $30 \%$ of students fall.
iii) The number of students who are :-
a) underweight
b) overweight, if 60 kg is considered as standard weight.
c) From the top of ahill, the angles of depression of the consecutive kilometer stone, due east are found to be $45^{\circ}$ and $60^{\circ}$ respectively. Find the distances of the two stones from the foot of the hill and the height of the hill.

Q10.
a) In the given figure, find $\angle \mathrm{CBA}$ and $\angle \mathrm{CQA}$


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b) If the lines $y=3 x+7$ and $2 y+p x=3$ are perpendicular to each other, find the value of $p$.
c)


In the figure O is the centre, $\mathrm{OA}=21 \mathrm{~cm}$. find the area of the shaded region.
Q11.a) A plane left 30 minutes later than the scheduled time and in order to reach the destination 1500 km away, in time, it had to increase its speed by $250 \mathrm{~km} / \mathrm{hr}$. from the usual speed. Find its usual speed.
b) Mr. Raman's Income from his salary during a year is Rs. 315000. His savings and donations are given below:-
Savings:-
i) Contribution towards Provident Fund $=$ Rs. 40,000
ii) Contribution towards L.I.C. Premium $=$ Rs. 24000
iii) Investment in National Savings Certificate $=$ Rs. 15000

Donations:-
i) To Prime Minister's Relief Fund = Rs. 10000 (eligible for $100 \%$ tax exemption)
ii) $\quad$ To Religious institutions $=$ Rs. 8000 (eligible for $50 \%$ tax exemption If a sum of Rs. 1600 per month was deducted every month towards tax from his salary for the first 11 month of the year, calculate his tax liability in the last month of the year.

1) Exemption on savings :- saving up to 1 lakh will be deducted from income before tax is calculated.
2) Exemptions on donations:- Deduction on income is allowed on certain specified donations
3) Rates of Income tax:-

|  | Taxable Income | Rates |
| :--- | :--- | :--- |
| i) | Upto Rs. 1 lakh | Nil |
| ii) | More than Rs. 1 lakh upto Rs. 1.5 lakh | $10 \%$ |
| iii) | More than Rs. 1.5 Lakh upto Rs. 2.5 lakh | $20 \%$ |
| iv) | More than Rs. 2.5 lakh | $30 \%$ |

4) Education Cess:- $2 \%$ on tax payable

| Net Income range | Income tax rates |
| :--- | :--- |
| Upto Rs. $1,00,000$ | Nil |
| Rs. $1,00,000$ to Rs. $1,50,000$ | $10 \%$ of the income over Rs. $1,00,000$ |
| Rs. $1,50,000$ to Rs. $2,50,000$ | Rs. $5,000+20 \%$ of the income over Rs. $1,50,000$ |
| Above Rs. 2,50,000 | Rs. $25,000+30 \%$ of the income over Rs.2,50,000 |
|  |  |

Education Cess : An education cess at the rate of $2 \%$ is levied on all income tax payers.

