Holiday Homework

Class: X   **Subject: Mathematics**

1. Two ships are there in the sea on either side of a light-house in such a way that the ships and the base of the light –house are in the same straight line. The angles of depression of two ships as observed from the top of the light house are 60^0 and 45^0. If the height of the light house is 200m, find the distance between the two ships.

2. Show graphically that the system of equations $2x + 4y = 10$ and $3x + 6y = 12$ has no solution.

3. Solve the following system of equation by cross multiplication method:
   $ax + by = a - b$ & $bx - ay = a + b$

4. Solve for x and y:
   $$\frac{57}{4x + 3y} + \frac{6}{4x - 3y} = 5$$
   $$\frac{38}{4x + 3y} + \frac{21}{4x - 3y} = 9$$

5. Given that $2^x = 8^{y+1}$ and $9^y = 3^{x-9}$, then find the value of $(x + y)$.

6. Find the value of k such that $x = a$ is a zero of the polynomial $x^2 - (a + b)x + k$. Also, find its other zero.

7. If α and β are the zeroes of the quadratic polynomial $f(t) = 3t^2 - 6t + 4$, find the value of $\frac{1}{\alpha} + \frac{1}{\beta}$.

8. A, B and C starts cycling around a circular path in the same direction at same time. Circumference of the path is 360 km. If the speed of A is 40 m/min, speed of B is 60 m/min and that of C is 72 m/min and they start from the same point, then after what time interval they will be together at the starting point?

9. The mean of the following frequency table is 53. But the frequencies f_1 and f_2 in the classes 20 - 40 and 60 - 80 are missing. Find the missing frequencies.

Age (in years)	0 - 20	20 - 40	40 - 60	60 - 80	80 - 100	Total
Number of people	15	f_1	21	f_2	17	100

10. The following table shows the marks obtained by 100 students of class X in a school during a particular academic session. Find the mode of this distribution.

Marks	Less than 10	Less than 20	Less than 30	Less than 40	Less than 50	Less than 60	Less than 70	Less than 80
No of students	7	21	34	46	66	77	92	100

11. If $\sec \theta + \tan\theta = p$, then find the value of $\sec\theta - \tan\theta$.

12. If $\cot\theta + \frac{1}{\cot\theta} = 2$ then find the value of $\cot^2\theta + \frac{1}{\cot^2\theta}$.