1. Solve for x: $\frac{1}{a+b+x} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x}$

2. If $S_n = 3n^2 + 5n$ for an A.P. Find a_n, d

3. Two water taps together can fill tank in 9 hr 36 min. The Tap of larger diameter takes 8 hour less than smaller one to fill tank separately. Find time in which each tap can separately fill the tank.

4. If the coordinates of the mid points of the sides of a triangle are $(1,2)$, $(0,-1)$ and $(2,-1)$. Find the coordinates of the vertices of triangle.

5. At 't' minutes past 2 p.m., the time needed by the minute hand of a clock to show 3 p.m. was found to be 3 minutes less than $\frac{t^2}{4}$ minutes. Find 't'.

6. If a, b, c, d and e form an A.P. then find the value of $a-4b+6c-4d+e$

7. If $\frac{a^{n+1}+b^{n+1}}{a^n+b^n}$ is the Arithmetic mean of 'a' & 'b' then find the value of 'n'.

8. Out of a number of Saras Birds, one fourth of the number are moving about in lotus plants; $\frac{1}{9}$th coupled (along) with $\frac{1}{4}$th as well as 7 times of the square root of the number move on a hill; 56 birds remains in the Vakula Tree. What is the total number of Birds.

9. Points P, Q, R and S divide a line segment joining $A(2,6)$ and $B(7,-4)$ in five equal parts. Find the coordinates of P and R.

10. In ΔPQR, $PD \perp QR$ such that D lies on QR. If $PQ = a$, $PR = b$, $QD = c$ and $DR = d$, prove that:
$$(a+b)(a-b) = (c+d)(c-d)$$

11. In a right ΔABC, $\angle C = 90°$, P & Q are the points on the side CA and CB respectively which divides these sides in the ratio 2:1, prove that
$$9(AQ^2 + BP^2) = 13AB^2$$

12. In a Trapezium ABCD, $AB \parallel DC$ and $DC = 2AB$. E&F lie on BC and AD respectively such that $\frac{BE}{EC} = \frac{4}{3}$ also $EF \parallel AB$. prove that: $7EF =$ [redacted]$11AB$.