Assignment I - ICSE 10 2018 - Q9(a)

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Equation for interest I on a reccuring deposit is:

$$I = \frac{P \cdot n(n+1) \cdot r}{12 \cdot 2 \cdot 100} \qquad (1)$$

Where P is the monthly deposit (in rupees), n is total time (in months), and r is percentage annual interest.

We are given $I = 5550$, $P = 1000$, and $r = 10$. Substituting, we get

$$5550 = \frac{1000 \cdot n(n+1) \cdot 10}{12 \cdot 2 \cdot 100}$$

$$n(n+1) = \frac{5550 \cdot 2400}{10000} = 1332 = 36 \cdot 37$$

Solving the quadratic, we get $n = 36$ or $n = -37$. Discarding the negative solution, we get that the time of maturity is 36 months, or 3 years.

We can verify this answer by graphing the interest as a function of time, i.e.,

$$y = \frac{5550 \cdot x(x+1) \cdot 10}{12 \cdot 2 \cdot 100} \qquad (2)$$

along with the interest at time of maturity $y = 5550$, and checking for the point of intersection, where y is the interest in rupees, and x is time in months.