S.6 MATHEMATICS PAPER 1 FACILITATION QUESTIONS

01/08/2023

1. (a) One root of the equation $x^2 + 6x - k = 0$ is three times the other. Find the roots and the value of k.

   (b) Given that x is so small that its cube and higher powers can be neglected, find the first three terms in the expansion of $\sqrt{\frac{1+x}{1-x}}$. By putting $x = \frac{1}{17}$, show that $\sqrt{2} \approx \frac{1226}{867}$.

2. (a) Find the equation of the chord joining the points $A(-2, 3)$ and $B(0, 15)$ on the curve $y = 15 - 3x^2$.

   (b) Show that the area enclosed by the curve and the chord AB is 4 square units.

   (c) Find the volume generated when the area in (a) above is rotated through 360^0 about the x-axis.

3. Sketch the curve $y = \frac{3x+3}{x(3-x)}$.

4. (a) The first term of an Arithmetic Progression (A.P) and a Geometric Progression (G.P) are equal. The common difference of the A.P is equal to the common ratio of the G.P while the second term of the A.P equals the sum of the first two terms of the G.P. If the sum of the first two terms of the A.P equals the third term of the G.P, find the possible values of the common difference and common ratio.

   (b) A boy wishes to build up a triangular pile of toy bricks so as to have one brick in the 1st row, two in the 2nd, 3 in the 3rd and so on. If he had 1000 bricks, how many rows can he complete and how many bricks has he left?

5. (a) Evalute: $\int_0^3 \sqrt{(9 - x^2)}\, dx$

   (b) Find: $\int \frac{dx}{e^x - 2}$