

MATHEMATICS (SCIENCE)

Time: $\frac{1}{2}$ hour

1. Express the complex number $\frac{3-\sqrt{-9}}{1-\sqrt{-4}}$ in the form $a + ib$. (4)

2. Convert the complex number $\sqrt{3} - i$ into polar form. (4)

3. Prove by the principle of mathematical induction that

$$\frac{1}{2} + \frac{1}{2^2} + \frac{1}{2^3} + \dots + \frac{1}{2^n} = 1 - \frac{1}{2^n} \quad (4)$$

4. Prove by the principle of mathematical induction that $5^n - 3^n$ is divisible by 2

5. Solve $24x < 100$, when

i) x is a natural number.

ii) x is an integer. (4)

[illegible]