

National Institute of Open Schooling
Senior Secondary Course: Mathematics
Lesson 10: Principle of Mathematical Induction
Worksheet -10

- 1 Write any five statements in Mathematics.
- 2 Differentiate between direct proof and proof by Mathematical induction in Mathematics with examples.
- 3 If P (n) is a statement $2^{3n} - 1$ is an integral multiple of 7, verify that P (1) and P (2) and P (3) are true.
- 4 Prove that $1 + 2 + 3 + \dots + n = \frac{n(n+1)}{2}$, $n \in N$
- 5 By using the principle of mathematical induction:

$$1 + 3 + 3^2 + \dots + 3^{n-1} = \frac{3^n - 1}{2}$$
, For all $n \in N$.
- 6 Find all natural numbers n , prove that $3^n > n$.
- 7 Prove that $n(n+1)(n+5)$ is a multiple of 3, for all $n \in N$ by principle of mathematical induction.
- 8 Prove that $\frac{1}{1 \times 2} + \frac{1}{2 \times 3} + \dots + \frac{1}{n(n+1)} = \frac{n}{n+1}$
 For $n \in N$
- 9 For all natural numbers $n \in N$, prove that $n < 2^n$ by mathematical induction.
- 10 By principle of mathematical induction for all $n \in N$:
 $n(n+1)(n+2)$ is divisible by 6.