



## MATHS

### BOOKS - JBD PUBLICATION

## PRINCIPLE OF MATHEMATICAL INDUCTION

### Example

1. ਸਾਰੇ  $n \geq 1$  ਲਈ, ਮਿੱਧ ਕਰੋ ਕਿ

$$1^2 + 2^2 + 3^2 + 4^2 + \dots + n^2 = \frac{n(n+1)(2n+1)}{6}$$



Watch Video Solution

2. Use principle of mathematical induction to prove

that:  $1 + 2 + 3 + \dots + n = \frac{n(n+1)}{2}$



**Watch Video Solution**

3. Using principle of mathematical induction show that

$$(2n + 7) < (n + 3)^2 \text{ for all } n \in \mathbb{N}$$



**Watch Video Solution**

4. Prove the following by using the principle of mathematical induction for all  $n \in \mathbb{N}$  :-

$$1 + 2 + 3 + \dots + n < \frac{1}{8}(2n + 1)^2.$$



**Watch Video Solution**

5. Using mathematical induction, show that  $n(n + 1)(n + 5)$  is a multiple of 3.



**Watch Video Solution**

6. Prove by the principle of mathematical induction  $10^{2n-1} + 1$  is divisible by 11.



**Watch Video Solution**

7. Prove, by Principle of Mathematical Induction, that the sum of the cubes of three consecutive natural numbers is divisible by 9.



**Watch Video Solution**

8. Show by mathematical induction that  $a^{2n} - b^{2n}$  is divisible by  $a+b$ .



**Watch Video Solution**

9. Prove by mathematical induction that

$$1 + 3 + 3^2 + \dots + 3^{n-1} = \frac{3^n - 1}{2}$$



**Watch Video Solution**

[Watch Video Solution](#)

10. Prove by mathematical induction that

$$\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \dots + \frac{1}{2^n} = 1 - \frac{1}{2^n}$$

[Watch Video Solution](#)

11. By the Principle of Mathematical Induction, prove the following for all  $n \in \mathbb{N}$ :

$$\left(1 + \frac{1}{1}\right) \left(1 + \frac{1}{2}\right) \left(1 + \frac{1}{3}\right) \dots \left(1 + \frac{1}{n}\right) = (n + 1)$$

.

[Watch Video Solution](#)