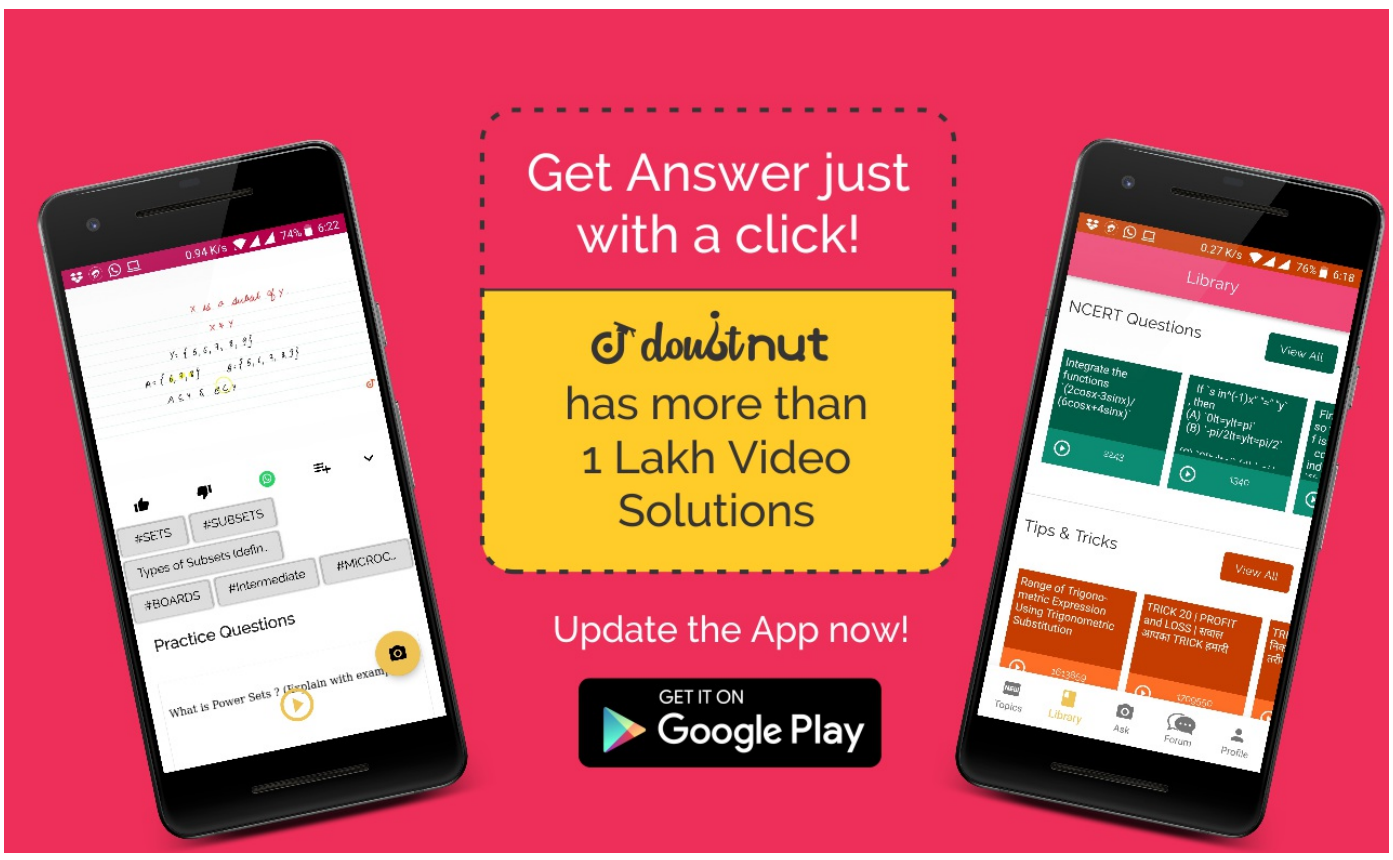
NCERT MATHS SOLUTIONS

Class - 11 || PRINCIPLE OF MATHEMATICAL INDUCTION

Ques No.	Question
1	**NCERT - CLASS 11 - CHAPTER 4 PRINCIPLE OF MATHEMATICAL INDUCTION - EXERCISE 4.1 - Q 1** Prove the following by using the principle of mathematical induction for all $n \in N$: $1+3+3^2+\ldots+3^{n-1}=\frac{(3^n-1)}{2}$ Watch Free Video Solution on Doubtnut
2	**NCERT - CLASS 11 - CHAPTER 4 PRINCIPLE OF MATHEMATICAL INDUCTION - EXERCISE 4.1 - Q 2** Prove the following by using the principle of mathematical induction for all $n \in N$: $1^3+2^3+3^3+\ldots+n^3=\left(\frac{n(n+1)}{2}\right)^2$ Watch Free Video Solution on Doubtnut
3	**NCERT - CLASS 11 - CHAPTER 4 PRINCIPLE OF MATHEMATICAL INDUCTION - EXERCISE 4.1 - Q 3** Prove the following by using the principle of mathematical induction for all $n \in N$: $\frac{1}{(1+2)}+\frac{1}{(1+2+3)}+\ldots+\frac{1}{(1+2+3+\ldots n)}=\frac{2n}{(n+1)}$ Watch Free Video Solution on Doubtnut

4	**NCERT - CLASS 11 - CHAPTER 4 PRINCIPLE OF MATHEMATICAL INDUCTION - EXERCISE 4.1 - Q 4** Prove the following by using the principle of mathematical induction for all $n \in N$: $1.2.3+2.3.4+\ldots+n(n+1)(n+2)=\frac{n(n+1)(n+2)(n+3)}{4}$ Watch Free Video Solution on Doubtnut
5	**NCERT - CLASS 11 - CHAPTER 4 PRINCIPLE OF MATHEMATICAL INDUCTION - EXERCISE 4.1 - Q 5** Prove the following by using the principle of mathematical induction for all $n \in N$: $1.3+2.3^2+3.3^3+\ldots+n.3^n=\frac{(2n-1)3^{n+1}+3}{4}$ Watch Free Video Solution on Doubtnut
	
6	**NCERT - CLASS 11 - CHAPTER 4 PRINCIPLE OF MATHEMATICAL INDUCTION - EXERCISE 4.1 - Q 6** Prove the following by using the principle of mathematical induction for all $n \in N$:

	$1.2 + 2.3 + 3.4 + \ldots + n(n+1) = \left[\frac{n(n+1)(n+2)}{3}\right]$ Watch Free Video Solution on Doubtnut
7	**NCERT - CLASS 11 - CHAPTER 4 PRINCIPLE OF MATHEMATICAL INDUCTION - EXERCISE 4.1 - Q 7** Prove the following by using the principle of mathematical induction for all $n \in N$: $1.3 + 3.5 + 5.7 + \ldots + (2n-1)(2n+1) = \frac{n(4n^2+6n-1)}{3}$ Watch Free Video Solution on Doubtnut
8	**NCERT - CLASS 11 - CHAPTER 4 PRINCIPLE OF MATHEMATICAL INDUCTION - EXERCISE 4.1 - Q 8** Prove the following by using the principle of mathematical induction for all $n \in N$: $1.2 + 2.2^2 + 3.2^2 + \ldots + n.2^n = (n-1)2^{n+1} + 2$ Watch Free Video Solution on Doubtnut
9	**NCERT - CLASS 11 - CHAPTER 4 PRINCIPLE OF MATHEMATICAL INDUCTION - EXERCISE 4.1 - Q 9** Prove the following by using the principle of mathematical induction for all $n \in N$: $\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \ldots + \frac{1}{2^n} = 1 - \frac{1}{2^n}$ Watch Free Video Solution on Doubtnut

10

NCERT - CLASS 11 - CHAPTER 4 PRINCIPLE OF MATHEMATICAL INDUCTION - EXERCISE 4.1 - Q 10

Prove the following by using the principle of mathematical induction for all $n \in N$:

$$\frac{1}{2.5}+\frac{1}{5.8}+\frac{1}{8.11}+..+\frac{1}{(3n-1)(3n+2)}=\frac{n}{(6n+4)}$$

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11

NCERT - CLASS 11 - CHAPTER 4 PRINCIPLE OF MATHEMATICAL INDUCTION - EXERCISE 4.1 - Q 11

Prove the following by using the principle of mathematical induction for all $n \in N$:

$$\frac{1}{1.2.3}+\frac{1}{2.3.4}+\frac{1}{3.4.5}+...+\frac{1}{n(n+1)(n+2)}=\frac{n(n+3)}{4(n+1)(n+2)}$$

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NCERT - CLASS 11 - CHAPTER 4 PRINCIPLE OF MATHEMATICAL INDUCTION - EXERCISE 4.1 - Q 12

Prove the following by using the principle of mathematical induction for all $n \in N$:

12	$a + ar + ar^2 + ..$ $+ \dot{ar}^{n-1}$ $= \frac{a(r^n - 1)}{r - 1}$ Watch Free Video Solution on Doubtnut
13	**NCERT - CLASS 11 - CHAPTER 4 PRINCIPLE OF MATHEMATICAL INDUCTION - EXERCISE 4.1 - Q 13** Prove the following by using the principle of mathematical induction for all $n \in N$: $\left(1 + \frac{3}{1}\right)\left(1\right.$ $\left. + \frac{5}{4}\right)\left(1\right.$ $\left. + \frac{7}{9}\right)..1 + \frac{\dot{(2n+1)}}{n^2}$ $= (n+1)^2$ Watch Free Video Solution on Doubtnut
14	**NCERT - CLASS 11 - CHAPTER 4 PRINCIPLE OF MATHEMATICAL INDUCTION - EXERCISE 4.1 - Q 14** Prove the following by using the principle of mathematical induction for all $n \in N$: $\left(1 + \frac{1}{1}\right)\left(1\right.$ $\left. + \frac{1}{2}\right)\left(1\right.$ $\left. + \frac{1}{3}\right)..1 + \frac{\dot{1}}{n}$ $= (n+1)$ Watch Free Video Solution on Doubtnut
	NCERT - CLASS 11 - CHAPTER 4 PRINCIPLE OF MATHEMATICAL INDUCTION - EXERCISE 4.1 - Q 15 Prove the following by using the principle of mathematical induction for all $n \in N$:

15	$1^2 + 3^2 + 5^2 + ..$ $+ (2n-1)^2$ $= \frac{n(2n-1)(2n+1)}{3}$ Watch Free Video Solution on Doubtnut
16	**NCERT - CLASS 11 - CHAPTER 4 PRINCIPLE OF MATHEMATICAL INDUCTION - EXERCISE 4.1 - Q 16** Prove the following by using the principle of mathematical induction for all $n \in N$: $\frac{1}{1.4} + \frac{1}{4.7}$ $+ \frac{1}{7.10} + ..$ $+ \frac{1}{(3n-1)(3n+1)}$ $= \frac{n}{(3n+1)}$. Watch Free Video Solution on Doubtnut
17	**NCERT - CLASS 11 - CHAPTER 4 PRINCIPLE OF MATHEMATICAL INDUCTION - EXERCISE 4.1 - Q 17** Prove the following by using the principle of mathematical induction for all $n \in N$: $\frac{1}{3.5} + \frac{1}{5.7} + \frac{1}{7.9}$ $+ ..$ $+ \frac{1}{(2n+1)(2n+3)}$ $= \frac{n}{3(2n+3)}$. Watch Free Video Solution on Doubtnut

18	**NCERT - CLASS 11 - CHAPTER 4 PRINCIPLE OF MATHEMATICAL INDUCTION - EXERCISE 4.1 - Q 18** Prove the following by using the principle of mathematical induction for all $n \in N$: $1 + 2 + 3 + . . . + n < \frac{1}{8}(2n + 1)^2$. Watch Free Video Solution on Doubtnut
19	**NCERT - CLASS 11 - CHAPTER 4 PRINCIPLE OF MATHEMATICAL INDUCTION - EXERCISE 4.1 - Q 19** Prove the following by using the principle of mathematical induction for all $n \in N$: $n(n + 1)(n + 5)$ is a multiple of 3. Watch Free Video Solution on Doubtnut
20	**NCERT - CLASS 11 - CHAPTER 4 PRINCIPLE OF MATHEMATICAL INDUCTION - EXERCISE 4.1 - Q 20** Prove the following by using the principle of mathematical induction for all $n \in N$: $10^{2n-1} + 1$ is divisible by 11. Watch Free Video Solution on Doubtnut
21	**NCERT - CLASS 11 - CHAPTER 4 PRINCIPLE OF MATHEMATICAL INDUCTION - EXERCISE 4.1 - Q 21** Prove the following by using the principle of mathematical induction for all $n \in N$: $x^{2n} - y^{2n}$ is divisible by $x + y$.

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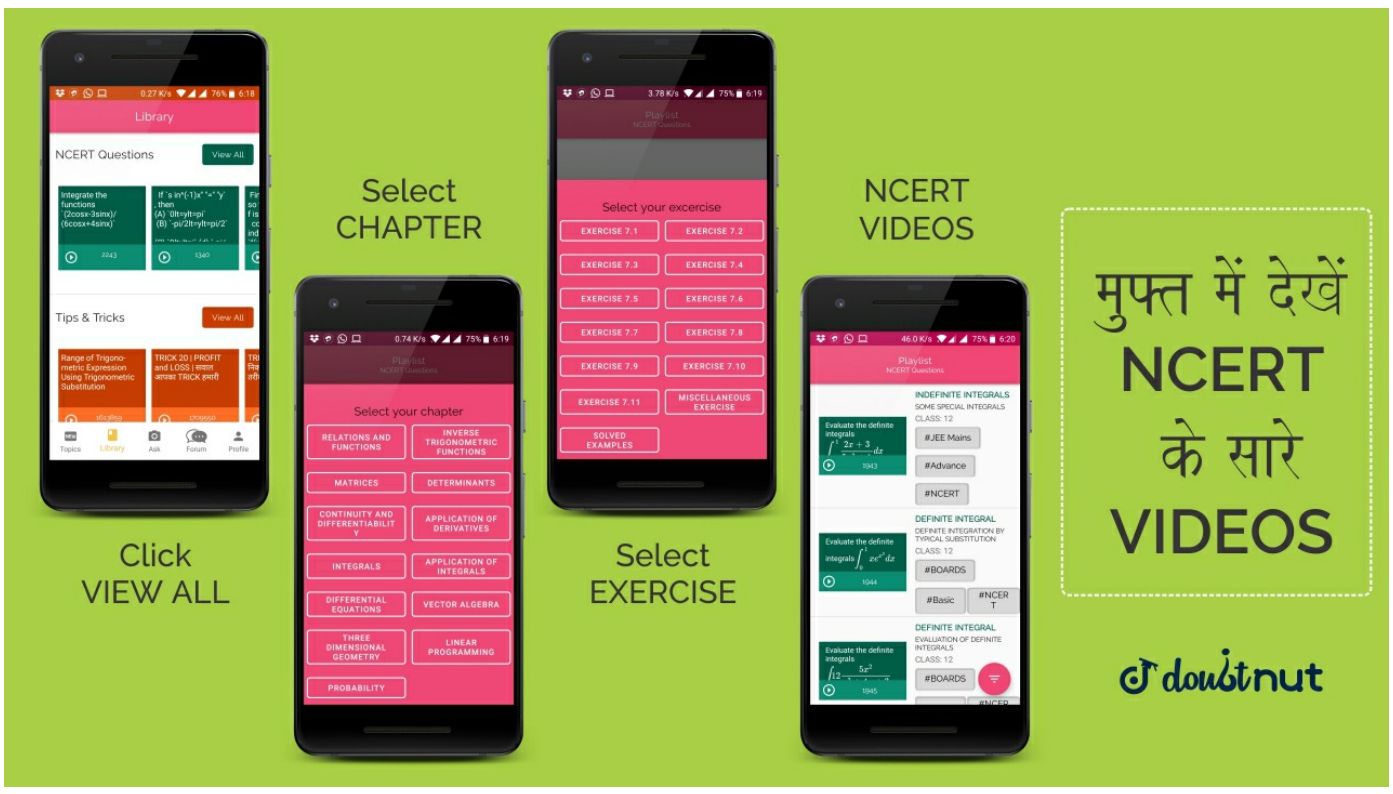
22	**NCERT - CLASS 11 - CHAPTER 4 PRINCIPLE OF MATHEMATICAL INDUCTION - EXERCISE 4.1 - Q 22** Prove the following by using the principle of mathematical induction for all $n \in N$: $3^{2n+2} - 8n - 9$ is divisible by 8. Watch Free Video Solution on Doubtnut
23	**NCERT - CLASS 11 - CHAPTER 4 PRINCIPLE OF MATHEMATICAL INDUCTION - EXERCISE 4.1 - Q 23** Prove the following by using the principle of mathematical induction for all $n \in N$: $41^n - 14^n$ is a multiple of 27. Watch Free Video Solution on Doubtnut
	
	NCERT - CLASS 11 - CHAPTER 4 PRINCIPLE OF MATHEMATICAL INDUCTION - EXERCISE 4.1 - Q 24
24	Prove the following by using the principle of mathematical induction for all $n \in N$: $(2n + 7) < (n + 3)^2$. Watch Free Video Solution on Doubtnut
25	**NCERT - CLASS 11 - CHAPTER 4 PRINCIPLE OF MATHEMATICAL INDUCTION - SOLVED EXAMPLES - Q 1** For all $n \geq 1$, prove that $1^2 + 2^2 + 3^2 + 4^2$ $+ \ldots + n^2 =$ $\frac{n(n+1)(2n+1)}{6}$ Watch Free Video Solution on Doubtnut

26	**NCERT - CLASS 11 - CHAPTER 4 PRINCIPLE OF MATHEMATICAL INDUCTION - SOLVED EXAMPLES - Q 2** Prove that $2^n > n$ for all positive integers n. Watch Free Video Solution on Doubtnut
27	**NCERT - CLASS 11 - CHAPTER 4 PRINCIPLE OF MATHEMATICAL INDUCTION - SOLVED EXAMPLES - Q 3** For all $n \geq 1$, prove that $\frac{1}{1.2} + \frac{1}{2.3} + \frac{1}{3.4}$ $+ .. + \frac{1}{n(n+1)}$ $= \frac{n}{n+1}$ Watch Free Video Solution on Doubtnut
28	**NCERT - CLASS 11 - CHAPTER 4 PRINCIPLE OF MATHEMATICAL INDUCTION - SOLVED EXAMPLES - Q 4** For every positive integer n, prove that $7^n - 3^n$ is divisible by 4. Watch Free Video Solution on Doubtnut
29	**NCERT - CLASS 11 - CHAPTER 4 PRINCIPLE OF MATHEMATICAL INDUCTION - SOLVED EXAMPLES - Q 5** Prove that $(1+x)^n$ $\geq (1+nx)$, for all natural number n, where $x \succ 1$. Watch Free Video Solution on Doubtnut
	Watch Free Video Solution on Doubtnut

30	**NCERT - CLASS 11 - CHAPTER 4 PRINCIPLE OF MATHEMATICAL INDUCTION - SOLVED EXAMPLES - Q 6** Prove that $2.7^n + 3.5^n - 5$ is divisible by 24, for all $n \in N$. Watch Free Video Solution on Doubtnut
31	**NCERT - CLASS 11 - CHAPTER 4 PRINCIPLE OF MATHEMATICAL INDUCTION - SOLVED EXAMPLES - Q 7** Prove that $1^2 + 2^2 + ... + n^2$ $> \frac{n^3}{3},$ $n \in N$ Watch Free Video Solution on Doubtnut
32	**NCERT - CLASS 11 - CHAPTER 4 PRINCIPLE OF MATHEMATICAL INDUCTION - SOLVED EXAMPLES - Q 8** Prove the rule of exponents $(ab)^n = a^n b^n$ by using principle of mathematical induction for every natural number. Watch Free Video Solution on Doubtnut
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