Course is completed. The course result can no longer be changed.

Mathematical Induction

Mathematical Induction

Introduction

Theoretical Material

Quiz
Graded Quiz

Quiz

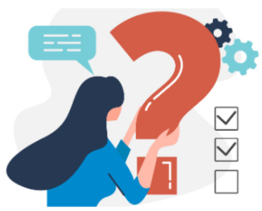
Course Completion

PREVIOUS

NEXT

Quiz

Bookmark this page



Now, it's time for a short quiz to recap what you've learned. The quiz is **graded**, so you can take it only once. Each question will be followed by feedback explaining why your answer is right or wrong. If your answer is incorrect, you will see a suggestion of what you might need to refresh your memory.

Good luck!

Read the question below and select the correct answer. Then, click "Submit."

What is the difference between induction and strong induction?

- ( ) Inductive assumption (a hypothesis) is different. For induction, it's required that $P(k)$ is true for all $k < n$
- (•) Inductive assumption (a hypothesis) is different. For strong induction, $P(k)$ must be true for all $k < n$.
- ( ) The base case is different. For strong induction it's required that $P(-1)$ is *true*
- ( ) The base case is different. For induction it's required that $P(-1)$ is *true*

✔

Correct: Well done!

Submit You have used 1 of 1 attempt

Read the question below and select the correct answer. Then, click "Submit."

What is the induction hypothesis for the following problem?

$$1 + 2 + 3 + \ldots + n = \frac{n(n+1)}{2}$$

- ( ) The statement is true for $n = k + 1 \ : P(k+1) = 1 + 2 + 3 + \ldots + k + (k+1) = \frac{(k+1)(k+2)}{2}$
- ( ) The statement is true for $n = k - 1 \ : P(k-1) = 1 + 2 + 3 + \ldots + (k-1) = \frac{(k-1)k}{2}$
- (•) The statement is true for $n = k \ : P(k) = 1 + 2 + 3 + \ldots + k = \frac{k(k+1)}{2}$
- ( ) The statement is true for $n = 1 \ : P(1) = 1 = \frac{1 \cdot 2}{2}$

✔

Correct: Excellent!

Submit You have used 1 of 1 attempt

Read the question below and select the correct answer. Then, click "Submit."

For every natural number n, $n \cdot (n^2 - 1)$ is divisible by which of the following?

- (•) 6

- 4
- 12
- 10
- None of the above

Correct: First, use MI to prove that $P(k) = k \cdot (k^2 - 1)$ is divisible by 6.

$$P(1) = 0 \text{ *is true*.}$$

Assuming that $P(k)$ *is true*, show that $P(k+1)$ *is true* as well.

$$P(k) = k(k^2-1) = k(k-1)(k+1)\, P(k+1) = k(k+1)(k+2) = k(k-1)(k+1) + 3k(k+1)$$

The first part is exactly $P(k)$ and divisible by 6, and the second part is obviously divisible by 3 and 2 because k or $k+1$ will be even.

Submit You have used 1 of 1 attempt

PREVIOUS NEXT