CLASS: Induction

- Due Feb 15 at 11:59pm
- Points 8
- Questions 8
- Time Limit None
- Allowed Attempts Unlimited

Instructions

This CLASS assignment is a introduction to Induction.

You have multiple attempts in answering the question

Chapter 5 Note (https://www.youtube.com/watch?v=ZIlcMafP36E&list=PLiwEbczHeZcuf7VyebtyKcVDqfViUkqfh&index=7&t=931s)

Take the Quiz Again

Attempt History

	Attempt	Time	Score
LATEST	Attempt 1	9 minutes	8 out of 8

Correct answers are hidden.

Score for this attempt: 8 out of 8
Submitted Feb 15 at 7:42pm
This attempt took 9 minutes.

Question 1
1 / 1 pts

Induction: The sum of first n natural numbers is n(n+1)/2 (https://www.youtube.com/watch?v=sVL6r4oCnSw&list=PLiwEbczHeZcuf7VyebtyKcVDqfViUkqfh&index=136)

Mathematical Induction Note.pdf (https://deanza.instructure.com/courses/33250/files/10862361?wrap=1) (https://deanza.instructure.com/courses/33250/files/10862361/download?download_frd=1)

Now answer the following question:

What is the every first step in Mathematical Induction?

- Consider the formua be true for a given number k

- Consider the formua be true for k=1
- Check the domain, and plug in the smallest value

Question 2
1 / 1 pts

Induction: The sum of first n natural numbers is n(n+1)/2 (https://www.youtube.com/watch?v=sVL6r4oCnSw&list=PLiwEbczHeZcuf7VyebtyKcVDqfViUkqfh&index=136)

What a closed form is? (https://www.youtube.com/watch?v=fgiAohoV6bU&list=PLiwEbczHeZcuf7VyebtyKcVDqfViUkqfh&index=137)

Now answer the following question:

In the first example in this lecture, what is the very first value that we select?

$$1 + 2 + \cdots + n = \frac{n(n+1)}{2}.$$

- 0
- 1
- 2

Question 3
1 / 1 pts

Sum of Geometric Sequence Using Induction (https://www.youtube.com/watch?v=5WqNU5oj4Mc&list=PLiwEbczHeZcuf7VyebtyKcVDqfViUkqfh&index=138)

Now answer the following question:

What is the name of the following Sum?

$$\sum_{i=0}^{n} r^i = \frac{r^{n+1} - 1}{r - 1}.$$

- Arithmetic Sum
- Geometric Sum
- Harmonic Sum

Question 4
1 / 1 pts

2^2n -1 is divisible by 3 Using Induction (https://www.youtube.com/watch?v=eobK_k8cflY&list=PLiwEbczHeZcuf7VyebtyKcVDqfViUkqfh&index=140)

Now answer the following question:

In the example in this lecture, what is the very first value that we select?

For all integers $n \geq 0$, $2^{2n} - 1$ is divisible by 3.

Make sure you feel comfortable about solving these types of problems.

- 0
- 1
- 2
- 3

Question 5
1 / 1 pts

2^2n -1 is divisible by 3 Using Induction (https://www.youtube.com/watch?v=eobK_k8cflY&list=PLiwEbczHeZcuf7VyebtyKcVDqfViUkqfh&index=140)

Now answer the following question:

Which law help to write the following?

$$\begin{aligned} 2^{2(k+1)} - 1 &= 2^{2k+2} - 1 \\ &= 2^{2k} \cdot 2^2 - 1 \end{aligned}$$

- Associative law
- Exponents Law
- Inductive Law
- Factoring Law

Question 6
1 / 1 pts

2^2n -1 is divisible by 3 Using Induction (https://www.youtube.com/watch?v=eobK_k8cflY&list=PLiwEbczHeZcuf7VyebtyKcVDqfViUkqfh&index=140)

Now answer the following question:

Which law help to write the last line?

$$\begin{aligned} 2^{2(k+1)} - 1 &= 2^{2k+2} - 1 \\ &= 2^{2k} \cdot 2^2 - 1 && \text{by the laws of exponents} \\ &= 2^{2k} \cdot 4 - 1 \\ &= 2^{2k}(3+1) - 1 \\ &= 2^{2k} \cdot 3 + (2^{2k} - 1) && \text{by} \end{aligned}$$

- Exponents Law
- Inductive Law
- Law of Algebra
- Idempotent Law

Question 7

1 / 1 pts

2n+1 is less than 2^n Using Induction (https://www.youtube.com/watch?v=tDFDDH3BEzI&list=PLiwEbczHeZcuf7VyebtyKcVDqfViUkqfh&index=141)

Now answer the following question:

In proving the following inequality, what is the very first number to plug in, in the basis step?

$$2n + 1 < 2^n.$$

- 0
- 1
- 2
- 3

Question 8

1 / 1 pts

I certify that I took note of all definitions and formulas. They are neat and organized.

- True
- False

Quiz Score: 8 out of 8