Started on	Wednesday, 7 July 2021, 10:36 AM
State	Finished
Completed on	Wednesday, 7 July 2021, 10:46 AM
Time taken	9 mins 57 secs
Marks	12.00/12.00
Grade	**10.00** out of 10.00 (**100**%)

Question **1**

Correct

Mark 1.00 out of 1.00

8221223

The induction method

Select one:

- a. is used to prove **all** mathematical problems.
- b. is used **only** to prove mathematical equalities.
- c. is used **only** to prove mathematical inequalities.
- d. is used to prove **many** mathematical problems. ✔

Question **2**

Correct

Mark 1.00 out of 1.00

8221223

In using the induction method to prove that P(n) is true for every n$\geq$5, we carry out the inductive step: for each **[...]**, if P(k) is true, then P(k+1) is also true.

What is **[...]**?

Select one:

- a. k$\geq$1.
- b. k$\geq$5. ✔
- c. k$\geq$0.
- d. k>5.

Question **3**

Correct

Mark 1.00 out of 1.00

8221223

We are going to use the induction method to prove that n!$< n^n$ for all n being integers greater than 1.

What do we do in the first step?

Select one:

- a. Show that P(1) is true.
- b. Show that P(3) is true.
- c. Show that P(0) is true.
- d. Show that P(2) is true. ✔

Question **4**

Correct

Mark 1.00 out of 1.00

8221223

Let P(n) be the statement that $1+2+3+\cdots+n=\frac{n(n+1)}{2}$.

What is P(1)?

Select one:

- a. $1+2+3+\cdots+n=\frac{n(n+1)}{2}$.
- b. 1(1+1)/2.
- c. $1=1(1+1)/2$. ✔
- d. 1.

Question **5**

Correct

Mark 1.00 out of 1.00

8221223

Find $f(4)$ if f is defined recursively by $f(0)=0, f(1)=2, f(n)=2f(n-1)-f(n-2), n\geq 2$

Select one:

- a. 8 ✔
- b. 9
- c. 6
- d. 10

Question **6**

Correct

Mark 1.00 out of 1.00

8221223

The induction method consists of

Select one:

- a. 1 step.
- b. 2 steps. ✔
- c. 3 steps.
- d. 4 steps.

Question **7**

Correct

Mark 1.00 out of 1.00

8221223

Let $\{a_n\}, n\geq 0$ be a sequence which is defined recursively by:

$a_0=2, a_n=a_{n-1}^2+1\,(n\geq 1)$

Is the following statement True or False?

$a_1=5, a_2=26, a_3=677$

Select one:

- a. True ✔
- b. False

Question **8**

Correct

Mark 1.00 out of 1.00

8221223

To use the induction method to prove that $n^2-1 \vdots 8$ whenever n is an odd number (n=1, 3, 5 ...), in the inductive step we assume that P(k) is true (for k is odd, k$\geq$ 1), what will we do next?

Select one:

- a. Prove P(k+1) is true.
- b. Prove P(k) is true.
- c. Prove P(k+3) is true.
- d. Prove P(k+2) is true. ✔

Question **9**

Correct

Mark 1.00 out of 1.00

8221223

We are using the induction method to prove that P(n) is true for every n$\geq$2. In the basis step, we have to specify

Select one:

- a. P(1) is true.
- b. P(2) is true. ✔
- c. P(0) is true.
- d. P(3) is true.

Question **10**

Correct

Mark 1.00 out of 1.00

8221223

Which of the following is the definition of the Fibonacci sequence?

Select one:

a. $f_0=0, f_1=1$
$f_n=f_{n-1}-f_{n-2}, n\geq 2$

b. $f_0=0, f_1=1$
$f_n=f_{n-1}+f_{n-2}, n\geq 2$ ✔

c. $f_0=1, f_1=2$
$f_n=f_{n-1}+f_{n-2}, n\geq 2$

d. $f_n=f_{n-1}+f_{n-2}, n\geq 2$

Question **11**

Correct

Mark 1.00 out of 1.00

8221223

Consider the sequence $a_n=2n, n\geq 0$. Which of the following is the recursive definition of $\{a_n\}, n\geq 0$?

Select one:

a. $a_0=0, a_n=a_{n-1}+2, n\geq 1$ ✔

b. $a_0=0, a_n=a_{n-1}-2, n\geq 1$

c. $a_0=1, a_n=a_{n-1}+2, n\geq 1$

d. $a_0=0, a_n=a_{n-2}+4, n\geq 2$

Question **12**

Correct

Mark 1.00 out of 1.00

8221223

How many steps do we do to define a sequence recursively?

Select one:

a. 1 step

b. 4 steps

c. 2 steps ✔

d. 3 steps

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