Started on	Saturday, 24 September 2022, 4:18 PM
State	Finished
Completed on	Saturday, 24 September 2022, 4:19 PM
Time taken	11 secs
Marks	0.00/24.00
Grade	<b>0.00</b> out of 10.00 ( <b>0</b> %)

Not answered

Marked out of 1.00

Give a <u>recursive definition</u> with initial condition(s) of

f( n ) =  $\overline{(-3)^n}$ , n = 0, 1, 2, ...

- a. None of these
- $oldsymbol{b}$  b. f(0) = 1, and f(n) = -f(n+1)/3 for n > 0
- $\circ$  c. f(0) = 1, and f(n) = -3f(n-1) for n > 0
- $\bigcirc$  d. f(0) = 1, and f(n) = -3<sup>f(n-1)</sup> for n > 0
- $\circ$  e. f(n) = -3f(n-1)

Your answer is incorrect.

The correct answer is: f(0) = 1, and f(n) = -3f(n-1) for n > 0

Not answered

Marked out of 1.00

Give a recursive definition of the set of strings S = {1,111,111111,1111111, ...}

- (i)  $1 \in S$ ;  $x \in S \rightarrow x11 \in S$
- (ii)  $1 \in S$ ;  $x \in S \rightarrow x1 \in S$
- a. Only (ii)
- b. Neither
- c. Only (i)
- d. Both

Your answer is incorrect.

Not answered

Marked out of 1.00

Given the function

$$A(m,n) = \begin{cases} 2n & \text{if } m = 0\\ 0 & \text{if } m \ge 1 \text{ and } n = 0\\ 2 & \text{if } m \ge 1 \text{ and } n = 1\\ A(m-1, A(m, n-1)) & \text{if } m \ge 1 \text{ and } n \ge 2 \end{cases}$$

Find A(2, 2)

- a. 8
- ob. 2
- oc. 1
- d. None of these
- e. 4

Your answer is incorrect.

The correct answer is:

4

Not answered

Marked out of 1.00

Consider the following procedure

procedure T(n: non-negative integer)

if n < 3 then return n

**else** return {n + *T*(*n*-1) - *T*(*n*-2)}

Find T(3), T(4), T(5)

- a. 4, 7, 6
- b. 5, 6, 7
- c. None of these
- d. 4, 5, 6
- e. 4, 6, 7

Your answer is incorrect.

The correct answer is:

4, 6, 7

Not answered

Marked out of 1.00

Give a recursive definition with initial condition(s) of the set  $A = \{1, 3, 9, 27, 81, ...\}$ .

Which one is true?

- (i)  $1 \in A$ ;  $x \in A \rightarrow 3x \in A$ .
- (ii)  $1 \in A$ ;  $x \in A \rightarrow 3^x \in A$ .
- a. Neither
- b. Only (i)
- oc. Both
- d. Only (ii)

Your answer is incorrect.

Not answered

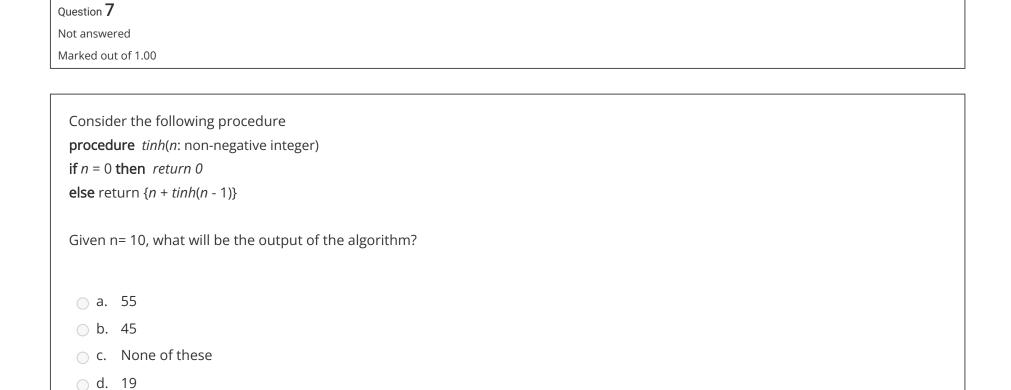
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Give a <u>recursive definition</u> with initial condition(s) of the set A = {4, 8, 12, 16, 20, ...}.

Which one is true?

- (i)  $4 \in A$ ;  $x \in A \rightarrow 4x \in A$ .
- (ii)  $4 \in A$ ;  $x \in A \rightarrow x + 4 \in A$ .
- a. Only (i)
- b. Only (ii)
- c. Neither
- d. Both

Your answer is incorrect.



Your answer is incorrect.

The correct answer is:

55

e. 10

Not answered

Marked out of 1.00

Suppose you wish to use the Principle of Mathematical Induction to prove

P(n):  $1 \times 1! + 2 \times 2! + 3 \times 3! + ... + n \times n! = (n + 1)! - 1$  for all integers n > 0. Write P(3).

- a. 23
- $\bigcirc$  b.  $1 \times 1! + 2 \times 2! + 3 \times 3!$
- oc. None of these
- od. 3×3!
- e.  $1 \times 1! + 2 \times 2! + 3 \times 3! = 4! 1$

Your answer is incorrect.

The correct answer is:

 $1 \times 1! + 2 \times 2! + 3 \times 3! = 4! - 1$ 

Not answered

Marked out of 1.00

Given the function

$$A(m,n) = \begin{cases} 2n & \text{if } m = 0\\ 0 & \text{if } m \ge 1 \text{ and } n = 0\\ 2 & \text{if } m \ge 1 \text{ and } n = 1\\ A(m-1, A(m, n-1)) & \text{if } m \ge 1 \text{ and } n \ge 2 \end{cases}$$

Find A(1, 2)

- a. 1
- b. 0
- o. 2
- od. 4
- e. None of these

Your answer is incorrect.

The correct answer is:

4

Not answered

Marked out of 1.00

Suppose you wish to prove that the following is true for all positive integers *n* by using the Principle of Mathematical Induction:

P(n):  $2 + 4 + 6 + ... + 2n = n \cdot (n + 1)$ 

Write P(4)

- a. 2 + 4 = 6
- $\bullet$  b. 2 + 4 + 6 + 8 = 4.5
- oc. 8
- d. None of these
- e. 2+4+6+8

Your answer is incorrect.

The correct answer is:

2 + 4 + 6 + 8 = 4.5

Not answered

Marked out of 1.00

Give a <u>recursive definition</u> with initial condition(s) of the set A = {1, 3, 9, 27, 81, ...}.

Which one is true?

- (i)  $1 \in A$ ;  $x \in A \rightarrow 3x \in A$ .
- (ii)  $1 \in A$ ;  $x \in A \rightarrow 3^x \in A$ .
- a. Only (ii)
- b. Neither
- c. Only (i)
- d. Both

Your answer is incorrect.

Not answered

Marked out of 1.00

Give a <u>recursive definition</u> with initial condition(s) of the sequence 1, 3, 4, 7, 11, 18, 29, ....

Which one is true?

- (i) Basis step:  $a_1 = 1$ ,  $a_2 = 3$ .
  - Recursive step:  $a_n = a_{n-1} + a_{n-2}$ , for n > 2.
- (ii) Basis step:  $a_1 = 1$ ,  $a_2 = 3$ .

Recursive step:  $a_{n+2} = a_n + a_{n+1}$ , for n > 2.

- a. Neither
- b. Only (ii)
- c. Both
- d. Only (i)

Your answer is incorrect.

Not answered

Marked out of 1.00

Use the Principle of Mathematical Induction to prove that  $2 \mid (n^2 + 3n)$  for all  $n \ge 1$ . Make a correct order of a proof by Induction.

- Suppose for every k ≥ 1, 2 | k² + 3k and 2 | 2(k + 2).
   2 | 1² + 3 · 1, which is true since 2 | 4.
- (2) We have  $(k+1)^2 + 3(k+1) = (k^2 + 3k) + 2(k+2)$ , which is divisible by 2.
- (3)  $2 \mid 1^2 + 3 \cdot 1$ , which is true since  $2 \mid 4$
- (4) Therefore, by Induction,  $2 \mid (n^2 + 3n)$  for all  $n \ge 1$ .
- a. (3), (1), (2), (4)
- b. (3), (2), (1), (4)
- c. (4), (3), (1), (2)
- od. (1), (2), (3), (4)
- e. None of these

Your answer is incorrect.

The correct answer is: (3), (1), (2), (4)

Not answered

Marked out of 1.00

Give a recursive definition with initial condition(s) of f(n) = (n-1)!, n = 1, 2, 3, ...

- a. f(1) = 1, and f(n) = (n-1)f(n-1) for n > 1
- $\bigcirc$  b. f(1) = 1, and f(n) = nf(n-1) for n > 1
- o. f(1) = 1, and f(n) = (n-1)f(n-2) for n > 1
- d. None of these
- e. f(1) = 0, and f(n) = (n-1)f(n-1) for n > 1

Your answer is incorrect.

The correct answer is: f(1) = 1, and f(n) = (n-1)f(n-1) for n > 1

Not answered

Marked out of 1.00

Suppose you wish to prove that the following is true for all positive integers *n* by using the Principle of Mathematical Induction:

P(n):  $1 + 3 + 5 + ... + (2n - 1) = n^2$ .

Write P(3)

- a.  $1+3+5=3^2$
- b. 1+3+5
- oc. 3
- od. 9
- e. None of these

Your answer is incorrect.

The correct answer is:

 $1 + 3 + 5 = 3^2$ 

Not answered

Marked out of 1.00

Give a recursive definition of the set

 $A = \{1, 5, 25, 125, 625, ...\}$ 

Which one is true?

- (i)  $1 \in A$ ;  $x \in A \rightarrow 5x \in A$
- (ii)  $1 \in A$ ;  $x \in A \rightarrow 5^x \in A$
- a. Both
- b. Only (ii)
- oc. Neither
- d. Only (i)

Your answer is incorrect.



Consider the following procedure

procedure tinh(m, n: non-negative integer)

if n = 0 then return m

else return {1 + tinh(m, n - 1)}

Given m = 13, n = 5, what will be the output of the algorithm?

a. 12

b. None of these

c. 65

d. 8

e. 18

Your answer is incorrect.

The correct answer is:

18

Not answered

Marked out of 1.00

Consider the set A defined recursively by

 $1 \in A$ ;  $3 \in A$ ,

 $x \in A \rightarrow x + 4 \in A$ 

Find {1, 2, 3, 4, 5, 6, 7, 8, 9, 10} - A

- a. None of these
- b. {1, 3, 5, 7, 9}
- o. {2, 4, 6, 8, 10}
- d. {2, 4, 5, 6, 7, 8, 9, 10}

Your answer is incorrect.

The correct answer is: {2, 4, 6, 8, 10}

Not answered

Marked out of 1.00

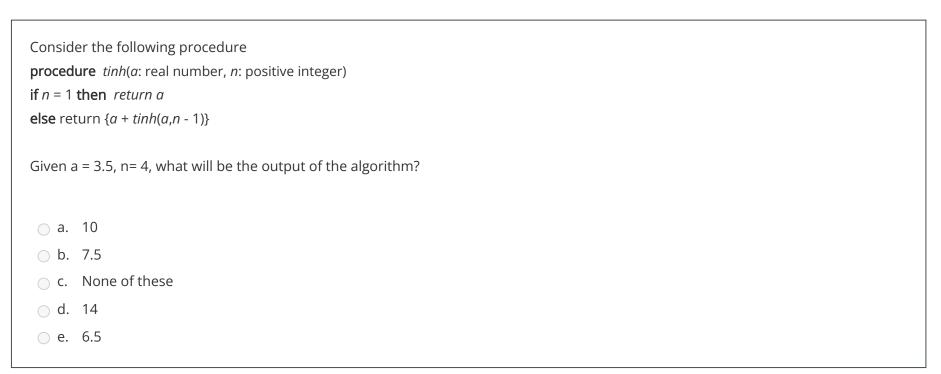
Give a <u>recursive definition</u> with initial condition(s) of the sequence  $a_1$  = 16,  $a_2$  = 13,  $a_3$  = 10,  $a_4$  = 7, ....

- a. None of these
- $\bigcirc$  b.  $a_1 = 16$ ,  $a_{n+1} = a_n 3$ , for n > 1
- oc.  $a_1 = 16$ ,  $a_n = a_{n-1} 3$  for n > 1
- od.  $a_1 = 16$ ,  $a_n = 3 a_{n-1}$ , for n > 1

Your answer is incorrect.

The correct answer is:  $a_1 = 16$ ,  $a_n = a_{n-1} - 3$  for n > 1





Your answer is incorrect.

The correct answer is:

14

Question 21	
Not answered	
Marked out of 1.00	

Given a recursive definition of the set of strings S

 $1 \in S; x \in S \rightarrow x11 \in S$ 

Which one is true?

- (i)  $1111 \in S$
- (ii) 11111  $\in S$
- a. Neither
- b. Only (ii)
- oc. Both
- d. Only (i)

Your answer is incorrect.

Not answered

Marked out of 1.00

Suppose you wish to use the Principle of Mathematical Induction to prove that

$$1+3+9+27+...+3^n = \frac{3^{n+1}-1}{2} \quad \text{for all } n \ge 0.$$

Write P(1), the statement when n = 1.

- a. 1+3
- $\bigcirc$  b. 1 = (3<sup>1</sup> 1)/2
- oc. None of these
- od. 1
- e.  $1 + 3 = (3^2 1)/2$

Your answer is incorrect.

The correct answer is:  $1 + 3 = (3^2 - 1)/2$ 

Not answered

Marked out of 1.00

Give a <u>recursive definition</u> with initial condition(s) of

$$f(n) = 5n + 7, n = 1, 2, ...$$

- a. f(n) = f(n-1) + 5
- b. None of these
- o. f(1) = 12, and f(n + 1) = f(n) + 5 for n > 1
- od. f(1) = 12, and f(n) = 5f(n-1) + 7 for n > 1
- $\circ$  e. f(1) = 12, and f(n) = f(n-1) + 5 for n > 1

Your answer is incorrect.

$$f(n) = 5n + 7, n = 1, 2, ...$$

BASIS STEP. f(1) = 12

RECURSIVE STEP. f(n) = f(n-1) + 5, if n > 1

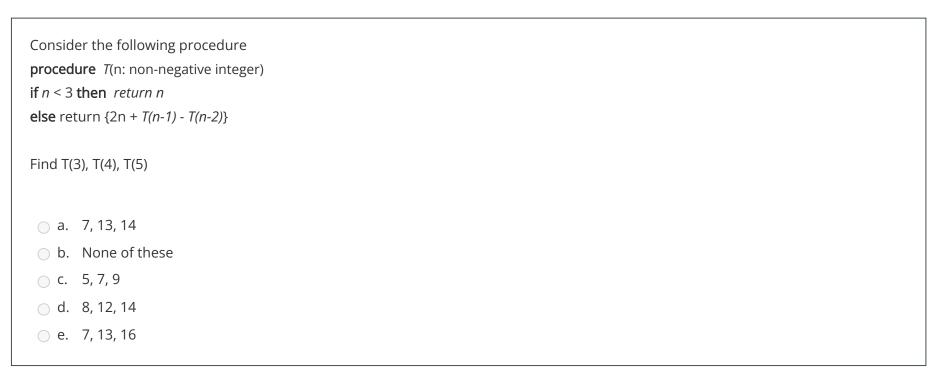
$$f(n) = 5n + 7$$

$$f(n) = 5(n-1) + 7 = 5n + 2$$

$$==> f(n) = f(n-1) + 5$$

The correct answer is: f(1) = 12, and f(n) = f(n-1) + 5 for n > 1





Your answer is incorrect.

The correct answer is: 7, 13, 16

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