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## ◀ Recurrence Relations

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## Quiz

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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."

Find the first six terms of the recurrence relation below:

$$a_n = 3 \cdot a_{n-3} + 2 \cdot a_{n-2} + a_{n-1}$$

$$a_1 = 1, a_2 = 2, a_3 = 3$$

- ☐ 10, 22, 51, 125, 293, 696
- ☒ 1, 2, 3, 10, 22, 51
- ☐ 1, 2, 3, 4, 5, 6
- ☐ 10, 20, 30, 100, 200, 500
- ☐ 1, 2, 3, 3, 4, 3



Correct: The first five terms are 1, 2, 3, 10, 22, 51.

You have used 1 of 1 attempt

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

Which of the explicit equations below models the sequence 17, 14, 11, 8...?

- ☒  $a_n = 20 - 3 \cdot n$
- ☐  $a_n = -17 + 3 \cdot n$
- ☐  $a_n = 17 + 3n$
- ☐  $a_n = 3n + 8$



Correct: The given sequence is an arithmetic progression and can be represented as the following equation:

$$a_n = 20 - 3 \cdot n$$

You have used 1 of 1 attempt

Read the question below and enter an answer. Then, click "Submit."

The sum of the first three terms in the recurrence relation  $a_n = a_{n-1} - 4$  is 72. Find the first term.



28

$$\begin{aligned} \text{Correct: } a_1 + (a_1 - 4) + ((a_1 - 4) - 4) &= 72 \\ 3a_1 &= 84 \\ a_1 &= 28 \end{aligned}$$

Submit

You have used 1 of 1 attempt

[? Hint](#)

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

What is the order of the recurrence relation below?

$$a_n = 6 \cdot a_{n-1} + 10 \cdot a_{n-2} + 7 \cdot a_{n-3}$$

☐ 1☐ 2☒ 3☐ 4☐ 5☐ 6☐ 7☐ 8☐ 9☐ 10

Correct: The order of the given recurrence relation is 3. Order is equal to the difference between the highest and lowest subscripts.

Submit

You have used 1 of 1 attempt

Read the question below and enter an answer. Then, click "Submit."

How many moves does it take to move four discs to another peg while adhering to all the conditions of the Tower of Hanoi problem?

15



15

Correct: The number of moves for n disks is equal to  $2^n - 1$ .

Submit

You have used 1 of 1 attempt

[? Hint](#)

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

Which of the following is the correct recurrence relation for the Tower of Hanoi problem?

☐  $a_n = 3 \cdot a_n - 1$ ☐  $a_n = 2 \cdot a_n$ ☐  $a_n = 2 \cdot a_{n-1}$ ☐  $a_n = 4 \cdot a_{n-2} + 1$ ☒  $a_n = 2 \cdot a_{n-1} + 1$ 

Correct: Great job! The appropriate recurrence relation for the Tower of Hanoi problem is:  $a_n = 2 \cdot a_{n-1} + 1$ .

Submit

You have used 1 of 1 attempt

