

Solutions

CS 381

Quiz 5

Instructions: For problems on permutations and combinations, you must show how you arrive at your answer. Writing down a number with no additional explanation is insufficient, even if it is the correct number.

1. Suppose that $\{a_n\}$ is defined recursively by $a_n = ((a_{n-1})^2 - 1)$ and that $a_0 = 2$. Find a_3 and a_4 .

1 pt.

$$a_0 = 2$$

$$a_1 = 2^2 - 1 = 4 - 1 = 3$$

$$a_2 = 3^2 - 1 = 9 - 1 = 8$$

$$a_3 = 8^2 - 1 = 64 - 1 = 63$$

$$a_4 = 63^2 - 1 = 3969 - 1 = 3968$$

2. In the sequence of Fibonacci numbers, $f_0 = 0$, $f_1 = 1$, and $f_2 = 1$. What do f_3 and f_4 equal?

1 pt.

$$f_0 = 0$$

$$f_1 = 1$$

$$f_2 = 1$$

$$f_3 = 2$$

$$f_4 = 3$$

3. Give a recursive definition for the set of positive integers divisible by 5.

1 pt.

$$\text{Basis step: } a_0 = 5$$

$$\text{Recursive step: } a_i = a_{i-1} + 5 \text{ for } i > 0 \text{ and } i \in \mathbb{N}$$