2.4 Sequences and Summations

2.4 pg 167 # 1

Find these terms of the sequence $\{a_n\}$, where $a_n = 2 \cdot (-3)^n + 5^n$.

a) a_0

b) a_1

c) a_4

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Is the sequence $\{a_n\}$ a solution of the recurrence relation $a_n = 8a_{n-1} - 16a_{n-2}$ if

a) $a_n = 0$?

b) $a_n = 1$?

c) $a_n = 2^n$?

d) $a_n = 4^n$?

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Find the solution to each of these recurrence relations and initial conditions. Use an iterative approach.

a) $a_n = 3a_{n-1}$, $a_0 = 2$

b) $a_n = a_{n-1} + 2$, $a_0 = 3$

2.4 pg 168 # 19

Suppose that the number of bacteria in a colony triples every hour.

a) Set up a recurrence relation for the number of bacteria after n hours have elapsed.

b) If 100 bacteria are used to begin a new colony, how many bacteria will be in the colony in 10 hours?

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What are the values of these sums?

a) $\sum_{k=1}^{5}(k+1)$

d) $\sum_{j=0}^{8}(2^{j+1} - 2^j)$

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Compute each of these double sums.

a) $\sum_{i=1}^{2} \sum_{j=1}^{3} (i + j)$

c) $\sum_{i=1}^{3} \sum_{j=0}^{2} i$

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Find $\sum_{k=100}^{200} k$.