Applications of Sequences

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Announcements

1. Homework and Project
2. Office hours, 10am - 11am.

Example

Let's look at some examples of where sequences come up in real life.

58. **[T]** Suppose you start with one liter of vinegar and repeatedly remove 0.1 L, replace with water, mix, and repeat.

a. Find a formula for the concentration after n steps.

b. After how many steps does the mixture contain less than 10% vinegar?

Example

Example

59. **[T]** A lake initially contains 2000 fish. Suppose that in the absence of predators or other causes of removal, the fish population increases by 6% each month. However, factoring in all causes, 150 fish are lost each month.

a. Explain why the fish population after n months is modeled by $P_n = 1.06P_{n-1} - 150$ with $P_0 = 2000$.

b. How many fish will be in the pond after one year?

Example

Example

61. **[T]** A student takes out a college loan of $\$10{,}000$ at an annual percentage rate of 6%, compounded monthly.

a. If the student makes payments of $\$100$ per month, how much does the student owe after 12 months?

b. After how many months will the loan be paid off?

Example

Example

Sequences really show up everywhere. Let's look at one more example of where they show up: The Fibonacci Sequence

$$F_{n+1} = F_n + F_{n-1}, \qquad F_0 = F_1 = 1$$

Let's play around with this sequence for a bit.

Example