

ZMATH 2016a.00420

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Modeling with sequences.

Consortium 108, 17 p., pull-out section (2015).

From the text: In Activity 1, students use two types of sequences to model population growth over time. The assumption that population grows by a constant amount each year leads to an arithmetic-sequence. A more realistic assumption that population grows by a constant annual percentage leads to a geometric sequence. The context in Activity 2 is credit-card debt. In the first scenario, no interest is charged and the \$ 200 payments lead to debt balances that form an arithmetic sequence. In the second scenario, interest is charged on the balance. In this case, the debt balances form a mixed sequence (a combination of arithmetic and geometric sequences). In Activity 3, students work with sequences that describe the rows of Pascal's triangle. A search for efficient formulas to calculate various terms in Pascal's triangle leads to several of Pascal's identities, which appear in his "Treatise on the Arithmetical Triangle". Finally, the connection is made between the terms in the n th row of Pascal's triangle and combinations " n choose k " for $k = 0, \dots, n$. Then, students use the rows of Pascal's triangle to construct probability models for the number of heads in n flips of a coin.

Classification: D80 I30 K20 M10

Keywords: sequences; student activities; teaching units; arithmetic sequences; geometric sequences; recursion; mathematical model building; real-life mathematics; mathematical applications; population growth; spreadsheets; graphing calculators; mixed sequences; Pascal's triangle; probability; teaching guides; worksheets