

Problem for 2017 October

Communicated by Dan Jurca

The first problem appeared as a puzzle in a Mensa publication in Chicago several decades ago; the second generalizes the first.

1. A certain house contains one hundred pounds of gold dust. One night elves sneak into the house and steal 1% of the gold dust and leave the rest. On the next night the elves return and steal 2% of the remaining gold dust and leave the rest. On the third night the elves return and steal 3% of the remaining gold dust and leave the rest; and so on, until on the one hundredth night the elves return and steal all of the remaining gold dust. On which night do the elves steal the most gold?
2. For some positive integer n on the first night elves steal $1/n$ of some gold dust and leave the rest; on the second night the elves steal $2/n$ of the remaining gold dust and leave the rest; on the third night the elves steal $3/n$ of the remaining gold dust and leave the rest; and so on, until on the n -th night the elves steal all of the remaining gold dust. On which night do the elves steal the most gold?