

ZMATH 2016e.00969

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Raking leaves.

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From the text: In the fall, raking leaves is a major chore in many households. Leaves must be gotten off the ground and, typically, into one pile. In the olden days, after a decent interval for jumping, the pile was then burnt; nowadays, it is more likely to be the compost pile, or the place from where the leaves will be taken to the dump. How do the leaves get to this terminal location? Usually the leaves will be raked into a number of smaller piles, and then carried in baskets, old sheets, or bags to the designated spot. Sometimes they are blown rather than raked, but raking is the more strenuous activity, and will be assumed in our model. The question we wish to address concerns these intermediate piles. How many are there, how big are they, how far apart are they, and which leaves go into which pile? Observation confirms that the piles are neither too big nor too small: If the total amount of leaves is significant, we do not rake them all into ONE pile. On the other hand, if we considered each leaf a separate pile and carried it individually to the designated spot, the casual observer and, more importantly, the spouse, would probably accuse us of malingering. There seems to be an intuitive optimum: Somehow, we know how many piles to make, and where to put them. When the raking gets to be too strenuous, we seem to stop moving that particular mass of leaves and start on a new pile.

Classification: M90 I40

Keywords: mathematical model building; line segments; intervals; mathematical applications; minimization of work; optimization; n piles; differential calculus; continuous model; discretization