9. [12 points] Katydyd is on vacation from her strenuous bakery job, and is at the beach. She is building a tower out of sand, but periodically sand falls off the top of the tower. Each time sand falls off the tower it gets 25% shorter, and between times sand falls off the top of the tower Katydyd increases its height by 2 inches.

a. [5 points] Let M_n denote the height of Katydyd's tower, in inches, immediately *before* the n^{th} time sand falls off the top of it. Before the first time sand falls off the tower it has a height of 6 inches (so $M_1 = 6$). Find expressions for the values of M_2, M_3 and M_4. You do not need to simplify your expressions.

Answer: $M_2 =$ _____

Answer: $M_3 =$ _____

Answer: $M_4 =$ _____

b. [5 points] Find a closed-form expression for M_n. Closed form means your answer should not include ellipses or sigma notation, and should NOT be recursive. You do not need to simplify your expression.

Answer: $M_n =$ _____

c. [2 points] If Katydyd were to keep doing this indefinitely, what height would her tower approach, in inches, in the long run?

Answer: _____