

Name: _____

Date: _____



FLATLAND the Movie

Area of a Fractal Plant

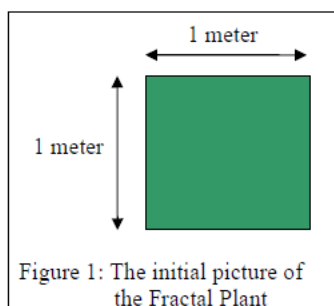


Fractal Plant:

Arlene Square wants to add a special plant to her garden, but she is not sure if she has enough room for it to fit.

The plant starts as a square of side length 1 meter. Each year, the plant grows larger in a very unique way. The plant sprouts an additional square for every edge that it had for the previous year. The length of the sides of the new square is always $\frac{1}{3}$ of the length of the edge that it sprouted from.

Arlene needs to know the length of the sides for each year and the number of smaller squares that have grown for each year. With this information, she can determine the total area that the plant is occupying.



To do this, Arlene decides to draw a picture for what the plant looks like after a few years. She starts by drawing the four squares that sprout after the first year. On the next page is the picture that she drew.

- In the first year, the square plant has four edges. In the second year, the plant has 20 edges. Find a formula for e_n , the number of edges of the plant in the n -th year.

$$e_n = \underline{\hspace{2cm}}$$



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