

f r q

a quadratic model is best.

An ecologist began studying a certain type of plant species in a wetlands area in 2013. In 2015 ($t = 2$), there were 59 plants. In 2021 ($t = 8$), there were 118 plants.

The number of plants of this species can be modeled by the function P given by $P(t) = ab^t$, where $P(t)$ is the number of plants during year t , and t is the number of years since 2013

Part A

7.



(i) Use the given data to write two equations that can be used to find the values for constants a and b in the expression for $P(t)$.

(ii) Find the values for a and b as decimal approximations.

Part C

In which t -value, $t = 6$ years or $t = 20$ years, should the ecologist have more confidence when using the model P ? Give a reason for your answer in the context of the problem.

Part A

Select a point value to view scoring criteria, solutions, and/or examples to score the response.



0	1	2
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The student response includes both of these criteria.

- Two equations
- Values of a and b

Model Solution

(i) Because $P(2) = 59$ and $P(8) = 118$, two equations to find a and b are

$$ab^2 = 59$$

$$ab^8 = 118.$$

(ii)