

f r q

- Interpretation provided includes the idea that there is a loss of points per month at the correct rate
- Correct answer with explanation

**Model Solution**

(i)  $\frac{R(3)-R(0)}{3-0} = -1.387$  points per month

(ii) On average, there is a loss (or decrease) of **1.387** points per month for the group's score.

(iii) The average rates of change of  $R$  from  $t = 3$  to  $t = p$  months are greater than the average rate of change from  $t = 0$  to  $t = 3$  months. Because  $R$  is logarithmic and decreasing, its graph is concave up. Therefore, the average rates of change, in points per month, are increasing over equal-length input-value intervals as  $t$  increases.

**10. Part C**

The leaders of the study decide to use model  $R$  to make predictions about the group's score beyond 12 months (1 year). For a given year, model  $R$  is an appropriate model if the group's predicted score at the end of the year is at least 1 point lower than the group's predicted score at the end of the previous year. Based on this information, for how many years is model  $R$  an appropriate model? Give a reason for your answer. (Note: The end of a year occurs every 12 months from the initial evaluation— $t = 12, t = 24, \dots$ )

**Part C**

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



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The student response includes this criterion.

- Answer with reason (based on use of the displayed logarithmic  $R(t)$  from Part A)

**Model Solution**

$$|R(24) - R(12)| \geq 1$$

$$|R(36) - R(24)| \geq 1$$

$$|R(48) - R(36)| < 1$$

$R$  is decreasing, and the graph of  $R$  is concave up.

Therefore, year 4 is the first year for which the model is not appropriate.

Model  $R$  is appropriate for the first 3 years  
( $t = 0$  to  $t = 36$ ).