

4. [0 points] Alex Artakis, the lead singer of Neverclear, left his pool uncovered when he went on tour. Due to the warm weather the pool loses 2.25% of its volume every week after the tour began. Let  $v(w)$  be the volume, in  $\text{m}^3$ , of Alex's pool  $w$  weeks after the tour began. When he left to go on tour the pool was full and had a volume of  $120 \text{ m}^3$ .

a. [2 points] Based on the description above, answer each of the following questions. Pick the best answer for each – you do NOT need to explain your reasoning for this question.

(i) Which of the following accurately describes  $v(w)$ ?

i.  $v(w)$  is increasing

iii.  $v(w)$  is constant

ii.  $v(w)$  is decreasing

iv. NONE OF THESE

(ii) What kind of function is  $v(w)$ ?

i.  $v(w)$  is linear

iii.  $v(w)$  is exponential

ii.  $v(w)$  is quadratic

iv. NONE OF THESE

b. [4 points] Write a formula for  $v(w)$  in terms of  $w$ , the number of weeks since the tour began.

*Solution:*

We know that the initial value is 120. Since it decreases by 2.25% each week, the growth factor is  $1 - 0.0225 = 0.9775$ .

**Answer:**  $v(w) = \underline{120 (0.9775)^w}$

c. [4 points] Evaluate  $v(10)$ , giving your answer in exact form or rounded to the nearest hundredth, and give a practical interpretation of your answer in the context of the problem. Use a complete sentence and **include units**.

*Solution:*

**Answer:**  $v(10) = \underline{120 (0.9775)^{10} \approx 95.58 \text{m}^3}$ .

**Interpretation:**

*Solution:* 10 weeks after the tour began there are approximately 95.58 cubic meters of water left in Alex's pool.