2. [11 points] As the Smashing Squash are touring, their merchandise varies in value in a way that can be modeled by a periodic function. Let \( W = P(t) \) be the value (in thousands of dollars) of an autographed vinyl record at time \( t \) (in months). Suppose that \( P(t) \) is a periodic function with period less than 18 months. Part of the graph of \( W = P(t) \) is shown below.

You do not need to show work for this problem.

a. [1 point] Find the average rate of change of \( P(t) \) between \( t = 8 \) and \( t = 16 \).

Answer: \[ \frac{4 - 12}{16 - 8} = -\frac{8}{8} = -1. \]

b. [2 points] Find the period of \( P(t) \). **Include units** in your answer.

Answer: \[ 17 - 8 = 9 \text{ months} \]

c. [2 points] Find the amplitude of the function \( P(t) \). **Include units** in your answer.

Answer: \[ \frac{18 - 4}{2} = 7 \text{ thousand dollars} \]

d. [2 points] Find the equation of the midline of the function \( P(t) \).

Answer: \[ W = 4 + 7 = 11 \]

e. [2 points] Find the smallest value of \( t \) that satisfies \( t > 20 \) and at which point the record has a value of $4,000.

Answer: \[ 16 + 9 = 25 \]

f. [2 points] Let \( k(t) = -100P(2t) \). What is the period of \( k(t) \)?

Answer: \[ \frac{1}{2} \cdot 9 = 4.5 \]