

10. [9 points] Let  $P(t)$  be a town's population, in thousands of people,  $t$  years after the beginning of 2000. Some values of  $P'(t)$ , the **derivative** of  $P(t)$ , are given in the table below.

|         |    |    |   |   |   |   |    |    |
|---------|----|----|---|---|---|---|----|----|
| $t$     | -8 | -3 | 0 | 3 | 6 | 8 | 12 | 15 |
| $P'(t)$ | 2  | 2  | 0 | 0 | 3 | 0 | -6 | -2 |

Assume that between each pair of consecutive values of  $t$  given in the table,  $P'(t)$  is either **always increasing**, **always decreasing**, or **always constant**.

- a. [1 point] Let  $y = P'(t)$ . What are the units of  $y$ ?

**Answer:** = \_\_\_\_\_

For each of the following, circle **all** correct answers.

- b. [2 points] At which of the following time(s) is the town's population increasing?

$t = -6$        $t = 2$        $t = 7$        $t = 13$       NONE OF THESE

- c. [2 points] On which of the following interval(s) is the town's population constant?

$(-7, -5)$        $(1, 2)$        $(7, 10)$       NONE OF THESE

- d. [2 points] On which of the following interval(s) is  $P(t)$  linear?

$(-7, -5)$        $(1, 2)$        $(7, 10)$       NONE OF THESE

- e. [2 points] At which of the following time(s) is the town's population the largest?

$t = 3$        $t = 6$        $t = 8$        $t = 15$