

8. [10 points]

- a. [4 points] A corporation owns two factories that produce light bulbs. The factories are located in Ann Arbor and Detroit. On one particular day, both factories begin producing light bulbs at 6 am. Let $a(t)$ be the total amount of light bulbs that the factory in Ann Arbor produced that day, t hours after 6 am. Find a formula for the following functions in terms of transformations to the function $a(t)$.

- i) Let $g(t)$ be the total amount of light bulbs produced by the factory in Ann Arbor so far that day, t hours after **9 am**.

$$g(t) = \underline{\hspace{2cm}}$$

- ii) The factory in Detroit is larger and produces double the amount of light bulbs than the factory in Ann Arbor three times faster. Let $d(t)$ be the total amount of light bulbs produced by the factory in Detroit so far that day, t hours after 6 am.

$$d(t) = \underline{\hspace{2cm}}.$$

- b. [6 points] A company sells bread to a small city. The company can produce $L(w)$ loaves of bread in a month with w kilograms of wheat. Let p_0 be the average amount of wheat (in kilograms) that the company uses each month and q_0 be the average amount of loaves the company produces monthly. Answer the following questions, the function L and the constants p_0 and q_0 may appear in your answers.

- i) This month, the company used half the average amount of wheat for their monthly production of bread, hence it will produce $\underline{\hspace{2cm}}$ loaves of bread.

- ii) Find an equation expressing the following fact: If the company uses 100 kilograms more than the average amount of wheat for their monthly production of bread, then it will produce 12% more than their average monthly production of bread.

Equation: $\underline{\hspace{10cm}}$