7. [11 points] In a small isolated island, the local government has decided to start a recycling program. Consider the following functions:

- Let $F(r)$ be the amount of money (in millions of dollars) that the local government has to spend in order to recycle r tons of garbage.

- Let $G(p)$ be the amount of recyclable garbage (in tons) the island generates in a year when there are p thousands of people living in the island.

- Let $H(t)$ be the amount of people (in thousands) living in the island t years after 2010.

Assume that the functions F, G and H have inverses.

   a. [6 points] Find a practical interpretation to the following mathematical expressions:

      i) $F(3) = 2$

      Solution: The government spends 2 million dollars recycling 3 tons of garbage.

      ii) $G(H(4))$

      Solution: The amount of recyclable garbage (in tons) the island generates in 2014.

   b. [1 point] Let A be the average rate of change of the function G for $3 \leq p \leq 5$. What are the units of A?

      Solution: Units of $A=$ tons per thousand of people.

   c. [4 points] Fill in the blanks in the following statements using the correct mathematical expression. A list of possible answers are listed below. Write your own expression if the correct expression is not on the list.

      Solution:

        i) The government spends 25 millions of dollars to recycle $\mathbf{F^{-1}(25)}$ tons of garbage.

        ii) There were $\mathbf{G^{-1}(F^{-1}(25))}$ thousand people living in the island when the local government spent 25 million dollars recycling garbage.