7. [8 points] An environmental impact study has determined that most of the pollution in the air in a small town is produced by automobile exhaust. Let \( P(c) \) be the level of carbon monoxide in the air (in mg per m\(^3\)) produced by \( c \) cars in this town in a day. Assume that \( P(c) \) is invertible. Let \( A(t) \) be the number of cars in the town, \( t \) days after January 1st, 2013 in the town.

a. [2 points] What is the practical interpretation of the vertical intercept of the function \( y = A(t) \)? Use a complete sentence and include units.

Solution: The vertical intercept is the number of cars in the town on January 1st, 2013.

b. [2 points] Write down a practical interpretation for the equation \( P(A(2)) = 1 \). Use a complete sentence and include units.

Solution: On January 3, 2013, the level of carbon monoxide in the air is 1 mg per m\(^3\).

c. [2 points] Write an expression for the number of cars that produce a level of carbon monoxide in the air of 10 mg per m\(^3\) in a day in this town.

Solution: \( P^{-1}(10) \).

d. [2 points] Let \( c_0 \) be the number of cars in the town during Thanksgiving day and \( p_0 \) be the average level of carbon monoxide in the air (in mg per m\(^3\)) during the year 2013. Write an equation that states the following fact:

The level of pollution in the town (in mg per m\(^3\)) during Thanksgiving day was exactly 20\% higher than the average level of carbon monoxide in the air (in mg per m\(^3\)) during the year 2013.

Solution: \( P(c_0) = 1.2p_0 \).