**7.** [13 points]  The population of fish (in thousands) in a lake $t$ years after 2010 is given by the function
$$F(t) = \frac{220}{1 + 2(1.35)^{-t}}.$$

**a.** [3 points]  Find the value and give a practical interpretation of the vertical intercept of the function $F(t)$.

Vertical intercept=_____

Interpretation:

**b.** [4 points]  When is the population in the lake equal to 150 thousand fish? Your answer must be found algebraically, written in exact form or rounded to the nearest 0.01.

$t=$_____

*This problem continues on the next page.*

*The statement of the problem is included here for your convenience.*

The population of fish (in thousands) in a lake $t$ years after 2010 is given by the function

$$F(t) = \frac{220}{1 + 2(1.35)^{-t}}.$$

**c.** [3 points]  Consider the graph of $y = F(t)$ for $-\infty < t < \infty$. Find the equation(s) of the horizontal asymptote(s) of the graph. If the graph has no horizontal asymptotes write "None".

Horizontal asymptote(s):⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯

**d.** [3 points]  Find the average rate of change of $F(t)$ for $-1 \leq t \leq 5$. Include units.

Answer: ⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯