Name:

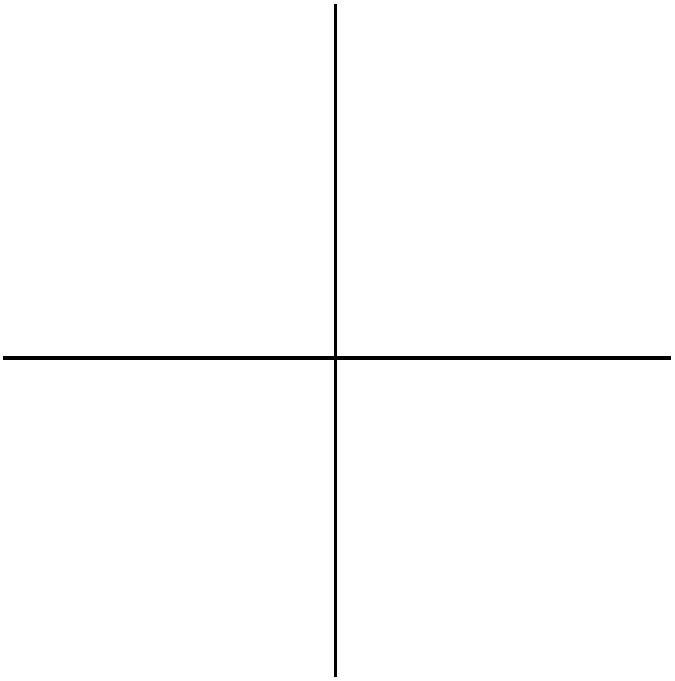
QUIZ 18 – MATH IB HL

1. (50%) A wheel of a bike loses 3% of air per minute. Initially there where 5 L of air inside the wheel.

   a. (20%) Write a function to describe the amount of air left inside the wheel after t minutes.

   b. (15%) Write a function to describe the amount of air that has been released to the air after t minutes.

   c. (15%) Graph both functions in an appropriate domain (on the same graph), include all intercepts, asymptotes, label the graph.



2. (20%) A certain atom decays by 50% in 5 days. Find the percentage of the sample that decays per day. Give your answer as an expression.

3. (30%) The benefit (B) of a company in millions of dollars is given by the following model where t is the time in months and t = 1 corresponds to January 2010

$$B(t) = -80 \cdot 2^{-\left(\frac{t-1}{10}\right)} + 10$$

   a. (10%) Find the benefit of the company in January 2010. Explain the result.

   b. (10%) According to this model what will be the benefit after a long time?

   c. (10%) In what exact month and year did the company start to have a positive benefit?