Student Name:_____

Instructor: Laird

Math 112 Section: 062

Directions: *Show all work, and answer each question that is asked. Explanations should be given in complete sentences. All graphs should be drawn accurately on this sheet, and be fully labeled.*

1. Rylin drinks a cup of coffee every morning at 7:00 am. The amount of caffeine (in mg) in her body as a result of drinking this coffee is given by the function $A(t) = 130(\frac{1}{2})^{t/5.5}$, where t is time in hours since 7:00 am.
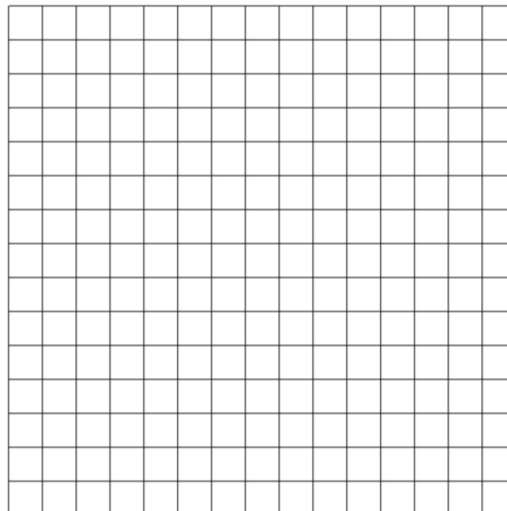
    Define the variables:

    t :

    A :

    What is an appropriate domain for this function? Justify your answer.

    Sketch an accurate graph of this function in an appropriate window, labeling axes and scale.

    What is the y -intercept of this function? What does this represent?

    After how many hours will there be half of the original amount of caffeine left in her body, assuming she doesn't ingest any more during the day?
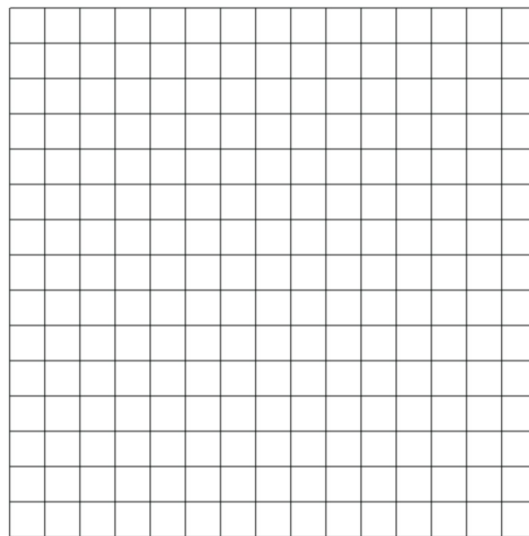
2. A flu patient is prescribed a course of an antiviral drug. The number of mg of the drug in the bloodstream t hours after the first dose is taken is given by the function $A(t) = 100te^{-2t}$.

Define the variables:

t :

A :

Sketch the graph of the function in an appropriate window, labeling axes and scale.

On what interval(s) is the amount of drug in the bloodstream:
Increasing?

Decreasing?

When is the amount of the drug at a maximum? Label the corresponding point on the graph.

3. A coroner arrives on the scene of a homicide at 10:00 pm in a temperature-controlled room, held at 70 degrees F (^{O}F). The temperature of the body is given by the function $T(t) = 22.4e^{-0.009t} + 70$, where t is time in minutes since 10:00 pm.

Define the variables:

t :

T :

Sketch the graph of the function in an appropriate window, labeling axes and scale.
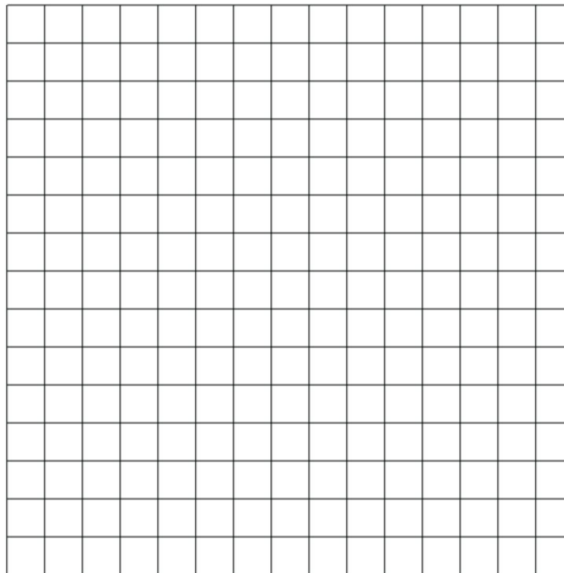
What happens to this function as time goes by? Why does this make sense?

Use the graph to approximate the time of death, assuming that normal body temperature is 98.6 ^{O}F.

4. The following graph shows a jogger's distance from home as a function of the number of minutes after 6:30 pm on a particular evening.
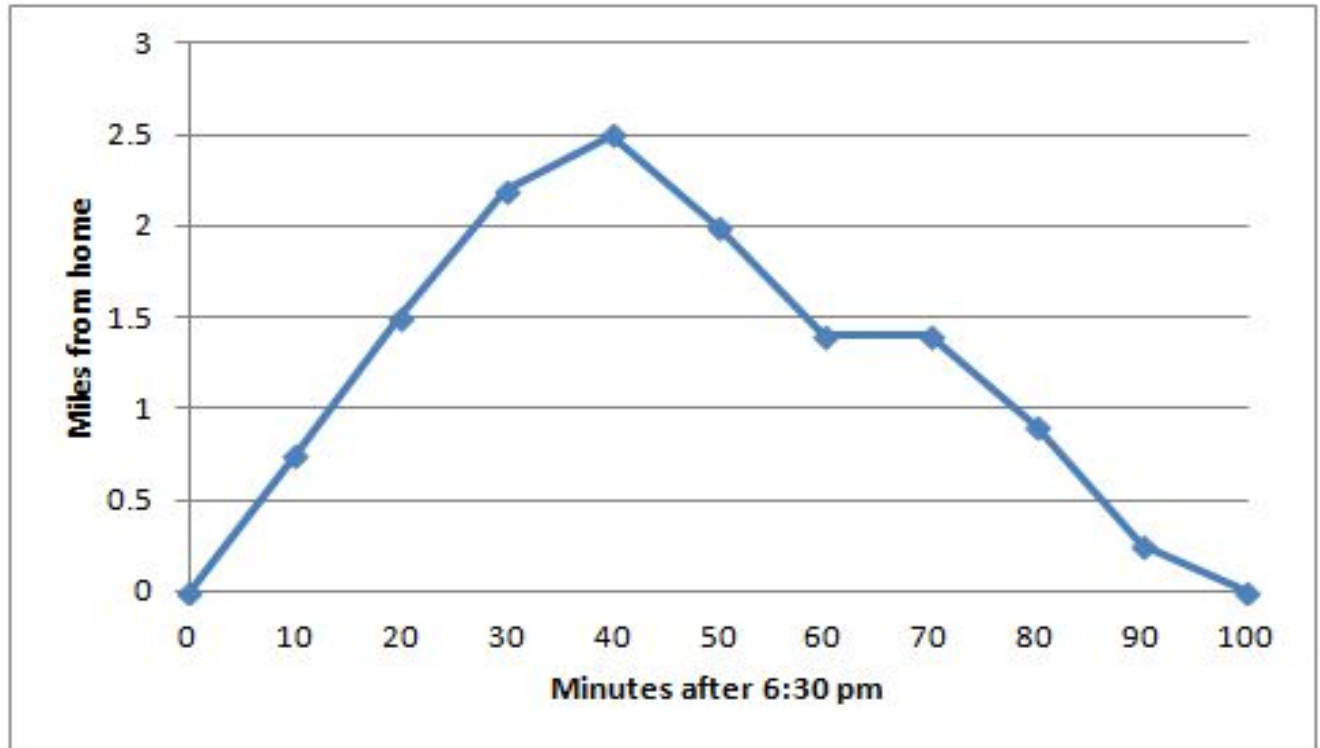
What are the intercepts of this function, and what do they tell you in practical terms?

On what interval(s) is this function:
    Increasing?

    Decreasing?

    Constant?

Write a few sentences that could describe this jogger's trip to someone who hasn't seen this graph.