Practice 4.9: Fitting Exponential Functions to Data A

Use the following information to complete problems 1–3.

An open water tank contains 500 gallons of water that is evaporating at a certain rate per hour (h).

Number of hours (h)	0	1	2	3	4	5
Amount of water remaining $f(h)$	500	480	460.8	442.4	424.7	407.7

1. Use the table to determine an exponential equation that models the situation.

2. Assuming there is no rain, how much water remains in the tank after 10 hours?

3. After how many hours will the tank contain about half its volume?

Use the following situation to answer problems 4–7.

An adult takes 800 milligrams of ibuprofen for a headache. The amount left in the body after t hours is represented in the following table:

Number of hours (t)	0	1	2	3	4	5
Ibuprofen remaining $f(t)$	800	568	403.3	286.3	203.3	144.3

4. Use the table to determine an exponential equation that models the situation.

5. How much ibuprofen will be left in the system after 10 hours?

6. After how many hours will there be 400 milligrams remaining in the system?

7. Assuming an adult can take the next dose when he has less than 60 milligrams left in his system, after how many hours can he take his next dose?

continued

Use the following situation and table to answer problems 8–10.

The population (in thousands) in Charlotte, NC, from 1990–2010 is shown in the following table. Let year 1990 = 0.

Years since 1990(t)	0	5	10	15	20
Population in thousands $f(t)$	430	473	570	631	739

8. Create an exponential equation that models the situation.

9. In 2014, the actual population of Charlotte, NC, was 2,380 thousand. Use your model to determine a predicted population for the year 2014 and compare your answer to the actual population. Was your model equation a close estimate to the actual population? Why or why not? Explain possible reasons.

10. An official report expects the population in Charlotte to be 2,166 thousand by 2030. Use your model to make your own prediction. Do the predictions agree? Why or why not?