The Injured Student Drug Dosage

1. A student strained her knee in an intramural volleyball game, and her doctor prescribed an anti-inflammatory drug to reduce the swelling. She is to take two 220-milligram tablets every 8 hours for 10 days. Her kidneys will filter 60% of this drug from her body every 8 hours. BUT she thinks that she should not need to take any more after the first dosage, because she feels better and is *strong*.

    a. Create a sequence of the amounts in her system after every 8 hours if she only takes the first dosage. What is the recursive equation that helps you get from one term in the sequence to the next? Write the equation and use it to calculate a table for the first 3 days of how much of the anti-inflammatory remains in her system. Based upon your table, explain to the athlete why it is not a good idea to take just one dose.

    b. Create a closed-form equation that would allow you to calculate the amount of drug in her system at any time. Explain how you figured this from your recursive equation and what each variable represents.

2. The student is to take two 220-milligram tablets every 8 hours for 10 days. Her kidneys will filter 60% of this drug from her body every 8 hours. You have convinced her that she should take the dosage as recommended. Thus, she would like to know how much of this drug is in her system during the first 10 days and how much of the drug will be in her system at the end of 10 days. You should let her know how much is in her system after she takes the next dose for each time period.

    Write the recursive equation that represents how to calculate the amount after dosage of the next time period, based upon the previous amount after dosage.

    If you a have access to *Fathom*™, ask your teacher for the instructions for creating recursive equations with their resulting sequences.

3. Make a graph of the amount of the drug in her system (*Amt_after_dose*) vs. *Periods*.

4. How much of the drug would have been in her system if she had continued to take the drug for a year?

5. If the athlete stops taking the drug after 10 days, how long does it take her system to eliminate most of the drug? (Hint: Add a new column to your *Fathom*™ table to determine what the amounts would become.)

6. Write a letter to the athlete describing how much drug will be in her system throughout her treatment. You should include your table and graph to help explain it to her.