BECA/Huson/Algebra II: Regents Prep

6 May 2024

Name:

Solutions

Practice Regents problems #6

AII-F.BF.2: Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.

1. Given the sequence a: 2, 5, 8, 11, ...

   (a) State whether the sequence is arithmetic, geometric, or neither. Justify your answer.

   arithmetic

   $$d = 5 - 2 = 3$$
   $$8 - 5 = 3$$
   $$11 - 8 = 3$$

   (b) Write a recursive formula for a.

   $$a_1 = 2$$
   $$a_n = a_{n-1} + 3$$

   (c) Write an explicit formula for the sequence.

   $$a_n = 2 + 3(n-1)$$

   (d) Find the sum of the first three terms the sequence.

   $$S_3 = 2 + 5 + 8 = 15$$

AII-F.LE.2: Construct a linear or exponential function symbolically given: a graph, a description of the relationship, or two input-output pairs (include reading these from a table).

2. The graph shows the amount of a medicine m, in milligrams, remaining in a patient's body h hours after receiving an injection. The amount of the medicine decreases exponentially.
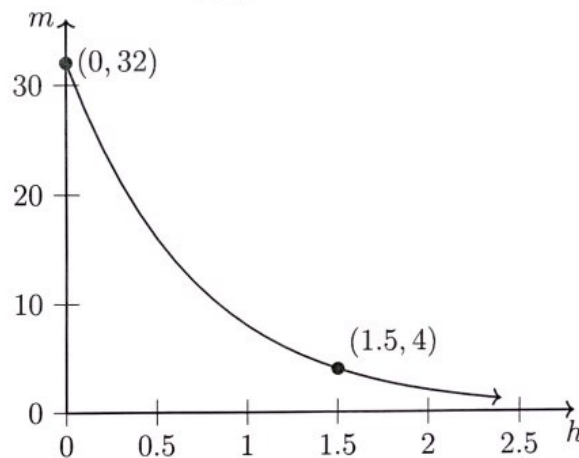
(a) By what factor did the medicine decrease in the first hour and a half? Explain how you know.

$$\text{factor}_{1\frac{1}{2} hrs} = \frac{4}{32} = \frac{1}{8}$$

(b) By what factor did the medicine decrease in the first half hour? What about in the first hour? Explain how you know.

$$f_{\frac{1}{2} hour} = \left(\frac{1}{8}\right)^{1/3} = \frac{1}{2}$$

$$\text{factor}_{1 hour} = \left(\frac{1}{8}\right)^{2/3} = \frac{1}{4}$$

(c) Write an equation relating m, the number of milligrams of the drug in the patient's body, and h, the number of hours since the injection.

$$m = 32 \cdot \left(\frac{1}{4}\right)^h$$