Warm-up:

Identify the explicit formula that represents the *arithmetic* sequence that has a common difference of 4 and a 15th term of 71.

$$a_n = a_1 + (n-1)(d) \qquad d = 4$$

$$a_{15} = 71$$

$$71 = a_1 + (15-1)(4)$$

$$71 = a_1 + 56$$

$$15 = a_1 \qquad \boxed{a_n = 15 + (n-1)(4)}$$

Sequences Applications Homework   Name: _____

Date: _____ Per: _____

1. Edgar is getting better at math. On his first quiz he scored 57 points. Then he scored 61 and 65 on his next two quizzes.

   a) Write the first six terms of the sequence representing Edgar's score for each quiz.

   57 , 61 , 65 , 69 , 73 , 77 , ...

   b) Is this sequence arithmetic or geometric? Explain.

   adding 4 each time to get next term.

   c) State the common difference or common ratio ___ $d = 4$ ___

   d) Write the explicit rule that models the sequence described.

   $$a_n = 57 + (n-1)(4)$$

   e) What is the Edgars score on his 9th quiz? Use the rule from part (d).

   $$a_9 = 57 + (9-1)(4) = 89$$

2. Viola makes gift baskets for Valentine's Day. She has 13 baskets left over from last year, and she plans to make 12 more each day.

   a) Write the first six terms of the sequence representing the number of baskets available to sell for each given day. (first term is 13)

   _____ , _____ , _____ , _____ , _____ , _____ , ...

   b) Is this sequence arithmetic or geometric? Explain.

   _____

   c) State the common difference or common ratio _____

   d) Write the explicit rule that models the sequence described.

   e) How many baskets does Viola have available to sell by the 15th day, the day her store opens? Use the rule from part (d).

each year

3. In a certain region, the number of highway accidents increased by 12% over a ten year period. In the first year, there were 5,120 accidents. **Hint: To find the next term, you want the original 100% plus the additional 12%.** 112%

   a) Write the first six terms of the sequence representing the number of accidents each day (first term is 5,120)

   5120 , 5734.4, 6422.5, 7193.2, 8056.4, 9023.2 ...

   b) Is this sequence arithmetic or (geometric)? Explain.

   c) State the common difference or common (ratio) $r = 1.12$

   d) Write the explicit rule that models the sequence described   Total Acc. $(10\,\text{yr})$

   $$a_n = 5120\,(1.12)^{(n-1)}$$

   $$S_{10} = \frac{5120(1 - 1.12^{10})}{(1 - 1.12)}$$

   e) How many accidents were there in year 10? Use the rule from part (d).

   $$a_{10} = 5120\,(1.12)^{(10-1)} = 14{,}198.2 \qquad S_{10} = 89{,}849.5$$

4. A house worth $350,000 when purchased. The following year it was worth $335,000, and the year after that it was worth $320,000.

   a) Write the first six terms of the sequence representing the house's worth each year (first term is 350,000)

   _____, _____, _____, _____, _____, _____, ...

   b) Is this sequence arithmetic or geometric? Explain.

   _____

   c) State the common difference or common ratio _____

   d) Write the explicit rule that models the sequence described.

   e) If the economy does not pick up and this trend continues, what will be the value of the house be in the 11ᵗʰ year? Use the rule from part (d).