Math 4
U8 L3 I1 Practice

Name Key

1. *Show mathematically* whether each of the following sequences is arithmetic, geometric, or neither.

a. $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \ldots$ Neither, no common ratio $\left[\frac{\frac{1}{3}}{\frac{1}{2}} \neq \frac{\frac{1}{4}}{\frac{1}{3}}\right]$ no common difference $\left[\frac{1}{3} - \frac{1}{2} \neq \frac{1}{4} - \frac{1}{3}\right]$

b. -1, 3, -9, 27, . . . Geometric: $\frac{3}{-1} = \frac{-9}{3} = \frac{27}{-9} = -3$

c. 5, 8, 11, 14, . . . Arithmetic: $8 - 5 = 11 - 8 = 14 - 11 = 3$

2. Find the 14th term of each sequence. *Hint: find a general formula to help you do this. . .*

a. the sequence in part (b) of number 1

$a_n = a_1 \cdot r^{n-1}$

$a_{14} = -1(-3)^{13}$

$= 1{,}594{,}323$

b. the sequence in part (c) of number 1

$a_n = a_1 + (n-1)d$

$a_{14} = 5 + (13) \cdot 3$

$= 44$

3. Find the missing terms of each sequence below by using the definition and solving algebraically for the common difference/ratio.

(a) Arithmetic sequence {3, $9\frac{1}{4}$, $15\frac{1}{2}$, $21\frac{3}{4}$, 28}

$\frac{28-3}{4} = 6\frac{1}{4} = d$

(b) Geometric Sequence {2, 8.2, 33.62, 137.842}

$\sqrt[3]{\frac{137.842}{2}} = 4.1 = r$

4. (a) Write both an explicit and a recursive formula for the sequence in number (3a).

$a_n = 3 + 6\frac{1}{4}(n-1)$

$\begin{cases} b_1 = 3 \\ b_{n+1} = b_n + 6\frac{1}{4} \end{cases}$

(b) Write both an explicit and recursive formula for the sequence in number (3b).

$a_n = 2 \cdot (4.1)^{n-1}$

$\begin{cases} b_1 = 2 \\ b_{n+1} = 4.1 \cdot b_n \end{cases}$

5. You drop a super ball from a certain height and measure the height of each bounce. The sequence of heights is geometric. Find the height of the ball on the 6th bounce if the height of the 5th bounce is 9 ft and the height of the 7th bounce is 5 ft. *Hint: think "constant ratio" and set up a proportion!*

29.16 21.735 16.2 12.075 9 | 6.708 | 5

$r = \sqrt[2]{\frac{5}{9}}$

Just for fun