Math 4
1-6 Practice

Name_____
Date_____

1. *Show mathematically* whether each of the following sequences is arithmetic, geometric, or neither. If it is arithmetic or geometric, find an explicit equation to model the sequence.

a. $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \ldots$ Neither $\frac{1}{3}-\frac{1}{2} \neq \frac{1}{4}-\frac{1}{3}$ & $\frac{\frac{1}{3}}{\frac{1}{2}} \neq \frac{\frac{1}{4}}{\frac{1}{3}}$

b. -1, 3, -9, 27, . . .

Geometric

$r = \frac{3}{-1} = \frac{-9}{3} = \frac{27}{-9} = -3$

$a_n = -1(-3)^{n-1}$

c. 5, 8, 11, 14, . . .

Arithmetic

$d = 8-5 = 11-8 = 14-11 = 3$

$a_n = 5 + 3(n-1)$

2. Find the 14th term of each sequence. *Hint: use the arithmetic equation to help you do this. . .*

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

$a_{14} = -1(-3)^{14-1} = 1,594,323$

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

$a_{14} = 5 + 3(14-1)$

$= 5 + 39$

$= 44$

3. Find the missing terms of the arithmetic sequence below algebraically. Show work.

$\{-9.5, -3.25, 3, 9.25, 15.5, 21.75, 28\}$

a_1 a_4

$28 = 3 + 4d$

$25 = 4d$

$6.25 = d$

4. In the sequence in problem (3), which term of the sequence is 603?

$603 = -9.5 + 6.25(n-1)$

$612.5 = 6.25(n-1)$

$98 = n-1$

$99 = n$

99th term

5. $\frac{4428675}{131072}$ is which term of the below sequence? Solve algebraically and show work.

$\{800, 600, 450, \ldots\}$

$r = \frac{600}{800} = \frac{3}{4} = 0.75$

$\frac{4428675}{131072} = 800\left(\frac{3}{4}\right)^{n-1}$

$\div 800 \qquad \div 800$

$\frac{177147}{4194304} = \left(\frac{3}{4}\right)^{n-1}$

$\log_{3/4} \frac{177147}{4194304} =$ 11th term

5. Suppose you drop a bounce ball from a certain height and measure the height of each bounce. The sequence of heights is geometric. Find an equation for a sequence that generates the bounce heights of the ball if the height of the 5th bounce is 9 ft and the height of the 7th bounce is 5 ft.

$a_1 \quad \_ \quad \_ \quad 12.07 \quad 9 \quad \_ \quad 5$

$a_5 \qquad\qquad a_7$

$5 = 9r^2$

$\frac{5}{9} = r^2$

$\frac{\sqrt{5}}{3} = r \approx 0.745$

$a_1 = 9 \cdot \frac{3}{\sqrt{5}} \cdot \frac{3}{\sqrt{5}} \cdot \frac{3}{\sqrt{5}} \cdot \frac{3}{\sqrt{5}}$

$= 9 \cdot \frac{81}{25}$

$= \frac{729}{25}$

$a_n = \frac{729}{25}\left(\frac{\sqrt{5}}{3}\right)^{n-1}$