Math 4 Honors
Lesson 5-6 Learning Check

Name_____
Date _____

In this learning check, you will be assessed on the following objectives:

- *I can find terms of a sequence with both types of rules – recursive and explicit.*
- *I can write explicit and recursive rules for sequences.*
- *I can use the explicit and recursive rules of sequences to solve problems.*

1. Find the first five terms in each of the following sequences. Also state whether the formula for each sequence is recursive, explicit or neither.

a) $\begin{cases} g_1 = 1 \\ g_{n+1} = 3g_n - 1,\ n \geq 1 \end{cases}$ recursive

$g_1 = 1$
$g_2 = 3 \cdot 1 - 1 = 2$
$g_3 = 3 \cdot 2 - 1 = 5$
$g_4 = 3 \cdot 5 - 1 = 14$
$g_5 = 3 \cdot 14 - 1 = 41$

b) $c_n = 2^n + 3$ explicit

$c_1 = 2^1 + 3 = 5$
$c_2 = 2^2 + 3 = 7$
$c_3 = 2^3 + 3 = 11$
$c_4 = 2^4 + 3 = 19$
$c_5 = 2^5 + 3 = 35$

2. Find the 30th term in the following sequence: 5, 4.5, 4.05, 3.645, ….
Round to the nearest 10,000th.

$r = \frac{4.05}{4.5} = .9$

$g_n = 5(.9)^{n-1}$ (geo.)

$g_{30} = 5(.9)^{30-1} \approx .2355$

3. Find an explicit rule for the following sequence: 18, 56, 120, 216, 350, …
Write your answer in factored form.

1st: 38, 64, 96, 134
2nd: 26, 32, 38
3rd: 6, 6

cubic regression

$g_n = n^3 + 7n^2 + 10n$
$= n(n^2 + 7n + 10)$
$g_n = n(n+5)(n+2)$

Proper Sequence Notation

4. Find the missing terms in the arithmetic sequence below. *Show work and/or explain your reasoning.*

14, 10, 6, 2, -2, -6, …

$c_n = c_1 + (n-1)d$
$-6 = 14 + (6-1)d$
$-6 = 14 + 5d$
$d = -4$

5. Given the following geometric sequence, which term in the sequence is $\frac{3}{1024}$?
Show work or explain your reasoning.

24, 12, 6, 3, …

① $24r^3 = 3$
$r^3 = \frac{1}{8}$
$r = \frac{1}{2}$

② $\frac{\frac{3}{1024}}{24} = \frac{24\left(\frac{1}{2}\right)^{n-1}}{24}$

$\frac{3}{24{,}576} = \left(\frac{1}{2}\right)^{n-1}$

$\frac{3}{24{,}576} = \left(\frac{1}{2}\right)^{n} \cdot \left(\frac{1}{2}\right)^{-1}$

$\frac{3}{49{,}152} = \left(\frac{1}{2}\right)^{n}$

$\frac{\log\left(\frac{3}{49{,}152}\right)}{\log \frac{1}{2}} = n \frac{\left(\log \frac{1}{2}\right)}{\left(\log \frac{1}{2}\right)}$

$n = 14$