Algebra 1: 4.3 **Name _____ Period _____**

Arithmetic and Geometric Sequences – Explicit Formulas

When you want to find the *n*th term in an arithmetic or geometric sequence…

Use an _____.

Determine each unknown term in the given arithmetic sequence using the explicit formula.

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

Example:

Determine the 20th term of the sequence 1, 4, 7, . . .

Define your variables:

n = term number = 20
a_n = nth term = a_{20}
a_1 = 1st term = 1
d = common difference = 2nd term – 1st term = 4 – 1 = 3

Use the explicit formula to solve:

$$a_{20} = 1 + 3(20-1)$$
$$a_{20} = 1 + 3(19)$$
$$a_{20} = 1 + 57$$
$$a_{20} = 58$$

1. Determine the 30th term of the sequence -10, -15, -20, . . .

2. Determine the 50th term of the sequence 100, 92, 84, . . .

3. Determine the 42nd term of the sequence 12.25, 14.50, 16.75, . . .

4. Determine the 25th term of the sequence 3.3, 4.4, 5.5, . . .

Determine each unknown term in the given geometric sequence using the explicit formula. Round to the nearest 100th if necessary.

$$g_n = g_1 \bullet r^{n-1}$$

Example:
Determine the 15th term of the sequence 0.125, -0.250, 0.500, …

Define your variables:

n = term number = 15
g_n = nth term = g_{15}
g_1 = 1st term = 0.125
r = common ratio = $\frac{2nd\ term}{1st\ term} = \frac{-0.250}{0.125} = -2$

Use the explicit formula to solve:

$$g_{15} = 0.125 \bullet (-2)^{15-1}$$
$$g_{15} = 0.125 \bullet (-2)^{14}$$
$$g_{15} = 0.125 \bullet 16384$$
$$g_{15} = 2048$$

5. Determine the 10th term of the sequence 3, 6, 12, …

6. Determine the 15th term of the sequence 1, -2, 4, …

7. Determine the 18th term of the sequence 3, 9, 27, …

8. Determine the 12th term of the sequence 4, 5, 6.25, …