## Algebra 2

## 11-05 Using Recursive Rules with Sequences

## Explicit Rule

- Gives the $n^{\text {th }}$ term $\qquad$
- $a_{n}=2+4 n$


## Recursive Rule

- Each term is found by knowing the $\qquad$
- $a_{1}=6 ; a_{n}=a_{n-1}+4$

Write the first 5 terms
$a_{1}=3, a_{n}=2 a_{n-1}-1 \quad a_{1}=2 ; a_{n}=\left(a_{n-1}\right)^{2}+1$

## Special Recursive Rules

- Arithmetic Sequence

$$
a_{n}=a_{n-1}+d, a_{1}=a_{1}
$$

- Geometric Sequence

$$
a_{n}=r \cdot a_{n-1}, a_{1}=a_{1}
$$

Write the rules for the arithmetic sequence where $a_{1}=15$ and $d=5$.
Explicit
Recursive

Write the rule for the geometric sequence where $a_{1}=4$ and $r=0.2$
Explicit
Recursive

Write a recursive rule for
$1,1,4,10,28,76, \ldots$
$44,11, \frac{11}{4}, \frac{11}{16}, \frac{11}{64}, \ldots$
$\qquad$

Write a recursive rule for
$a_{n}=30-5 n \quad a_{n}=12(11)^{n-1}$

Write an explicit rule for each sequence.
$a_{1}=7, a_{n}=a_{n-1}+4$
$a_{1}=-2 ; a_{n}=3 a_{n-1}$

A controlled laboratory contains about 500 mosquitoes. Each day, 100 new mosquitoes hatch, but the population declines $85 \%$ due to a pesticide and natural causes.
a. Write a recursive rule for the number $a_{n}$ of mosquitoes at the start of the $n^{\text {th }}$ day.
b. Find the number of mosquitoes at the start of the fourth day.
c. Describe what happens to the population of mosquitoes over time.

You borrow $\$ 2000$ to travel. The loan has a $9 \%$ annual interest rate that is compounded monthly for 2 years. The monthly payment is $\$ 91.37$.
a. Find the balance after the fifth payment.
b. Find the amount of the last payment.

