

**Self Check #16, Recursive & Explicit Sequences** Date \_\_\_\_\_ Period \_\_\_\_\_

Given the first four numbers in each arithmetic sequence write a recursive and explicit formula:

1. 7, 15, 23, 31  $d=8$   
 $15-7=8$   
 $23-15=8$   
 $31-23=8$   
 Recursive  $f(0)=7$   
 $f(x+1)=f(x)+8$   
 Explicit  $f(x)=7+8x$   
 $f(x)=7+x \cdot 8$

2. 1, -5, -11, -17  $d=-6$   
 $-5-1=-6$   
 $-11+5=-6$   
 $-17+11=-6$   
 Recursive  $f(0)=1$   
 $f(x+1)=f(x)-6$   
 Explicit  $f(x)=1-6x$   
 $f(x)=1-x \cdot 6$

Given the first four numbers in each geometric sequence write a recursive and explicit formula:

3. 81, 27, 9, 3  $r=\frac{1}{3}$   
 $\frac{27}{81}=\frac{1}{3}$   
 $\frac{9}{27}=\frac{1}{3}$   
 $\frac{3}{9}=\frac{1}{3}$   
 Recursive:  $f(0)=81$   
 $f(x+1)=f(x) \cdot \frac{1}{3}$   
 Explicit:  $f(x)=81\left(\frac{1}{3}\right)^x$

4. -5, -30, -180, -1080  $r=6$   
 $\frac{-30}{-5}=6$   
 $\frac{-180}{-30}=6$   
 $\frac{-1080}{-180}=6$   
 Recursive:  $f(0)=-5$   
 $f(x+1)=f(x) \cdot 6$   
 Explicit:  $f(x)=-5 \cdot 6^x$

Use the pattern of the following arithmetic sequence figures write a recursive and explicit formula:

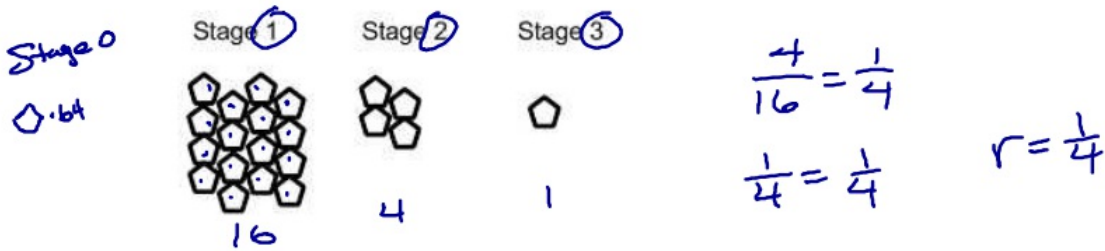


5. Explicit Rule:  $f(x)=1+3x$   
 Recursive Rule:  $f(0)=1$   
 $f(x+1)=f(x)+3$   
 (or)  $f(x)=1+x \cdot 3$

6. How many stars will there be in the 8<sup>th</sup> stage?      12<sup>th</sup> stage?  
 $f(8)=1+3(8)$        $f(12)=1+3(12)$   
 $=25$        $=37$

7. What stage is the figure with 61 stars?  
 $61=1+3x$   
 $-1 \quad -1$   
 $\frac{60}{3}=\frac{3x}{3}$   
 $20=x$   
20<sup>th</sup> Stage

Use the pattern of the following geometric sequence figures write a recursive and explicit formula:



8. Explicit Rule:

$$f(x) = 64 \left(\frac{1}{4}\right)^x$$

Recursive Rule:

$$f(0) = 64$$

$$f(x+1) = f(x) \cdot \frac{1}{4}$$

9. What is the 5<sup>th</sup> term in the sequence?

$$f(5) = 64 \left(\frac{1}{4}\right)^5$$

$$= \frac{1}{16}$$

10. What term in the sequence is 64?

Stage 0

Find the next four terms in each of the following sequences.

11.  $f(0) = 3$      $f(x+1) = f(x) + 5$     3, 8, 13, 18,

12.  $f(0) = 2$      $f(x+1) = f(x) \cdot 3$     2, 6, 18, 54,

13.  $f(x) = 5 \cdot 2^x$     5, 10, 20, 40, 80,

14.  $f(x) = -6 + x \cdot 5$     -6, -1, 4, 9,