

# Lesson 1.3 • A First Look at Limits

Name \_\_\_\_\_

Period \_\_\_\_\_

Date \_\_\_\_\_

1. For each sequence, find the value of  $u_1$ ,  $u_2$ , and  $u_3$ . Identify the type of sequence (arithmetic, geometric, or shifted geometric) and tell whether it is increasing or decreasing.

a.  $u_0 = 25$   
 $u_n = u_{n-1} + 8$  where  $n \geq 1$

c.  $u_0 = 48$   
 $u_n = u_{n-1} - 6.9$  where  $n \geq 1$

e.  $u_0 = 500$   
 $u_n = (1 - 0.80)u_{n-1} + 25$  where  $n \geq 1$

b.  $u_0 = 10$   
 $u_n = 0.1u_{n-1}$  where  $n \geq 1$

d.  $u_0 = 100$   
 $u_n = 1.01u_{n-1}$  where  $n \geq 1$

f.  $u_0 = 490$   
 $u_n = (1 + 0.70)u_{n-1} - 50$  where  $n \geq 1$

2. Solve.

a.  $r = 0.9r + 30$

c.  $t = 0.82t$

e.  $w = 0.60w - 20$

b.  $s = 25 + 0.75s$

d.  $v = 45 + v$

f.  $z = 0.125z + 49$

3. Find the long-run value for each sequence.

a.  $u_0 = 25$   
 $u_n = 0.8u_{n-1}$  where  $n \geq 1$

c.  $u_0 = 48$   
 $u_n = 0.75u_{n-1} + 25$  where  $n \geq 1$

e.  $u_0 = 62$   
 $u_n = (1 - 0.2)u_{n-1}$  where  $n \geq 1$

g.  $u_0 = 500$   
 $u_n = (1 - 0.80)u_{n-1} + 25$  where  $n \geq 1$

b.  $u_0 = 100$   
 $u_n = 0.1u_{n-1}$  where  $n \geq 1$

d.  $u_0 = 12$   
 $u_n = 0.9u_{n-1} + 2$  where  $n \geq 1$

f.  $u_0 = 45$   
 $u_n = (1 - 0.05)u_{n-1} + 5$  where  $n \geq 1$

h.  $u_0 = 350$   
 $u_n = (1 - 0.75)u_{n-1} - 30$  where  $n \geq 1$

4. Write a recursive formula for each sequence. Use  $u_0$  for the first term given.

a. 0, 20, 36, 48.8, ...

c. 50, 36, 27.6, 22.56, ...

e. 180, 144, 111.6, 82.44, ...

g. 500, 650, 830, 1046, ...

b. 100, 160, 226, 298.6, ...

d. 40, 44, 50.4, 60.64, ...

f. 2500, 1280, 670, 365, ...

h. 90, 67, 48.6, 33.88, ...

# Lesson 1.4 • Graphing Sequences

Name \_\_\_\_\_ Period \_\_\_\_\_ Date \_\_\_\_\_

1. Write five ordered pairs that represent points on the graph of each sequence.

a.  $u_0 = 2$

$u_n = u_{n-1} + 8$  where  $n \geq 1$

c.  $u_0 = 0$

$u_n = 2.5u_{n-1} + 10$  where  $n \geq 1$

e.  $u_0 = 60$

$u_n = 0.75u_{n-1} + 15$  where  $n \geq 1$

b.  $u_0 = 10$

$u_n = 0.1u_{n-1}$  where  $n \geq 1$

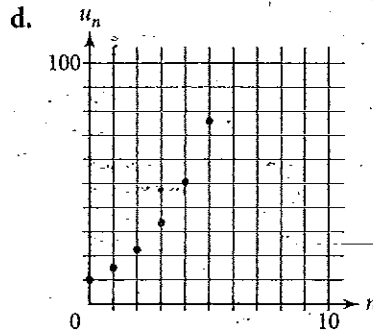
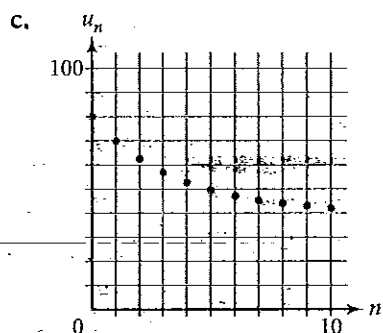
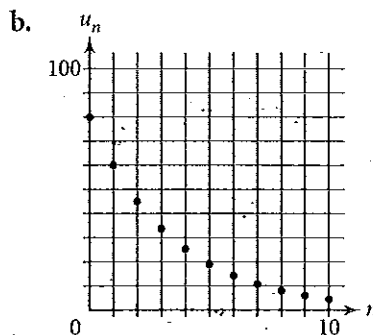
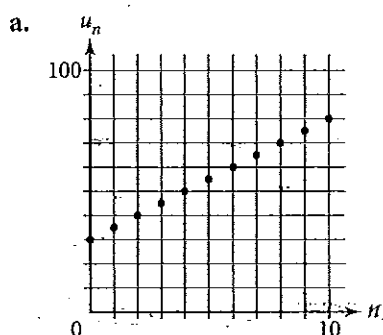
d.  $u_0 = 150$

$u_n = 0.8u_{n-1} - 10$  where  $n \geq 1$

f.  $u_0 = 250$

$u_n = 1.2u_{n-1} - 25$  where  $n \geq 1$

2. Identify each graph as a representation of an arithmetic sequence, a geometric sequence, or a shifted geometric sequence. Use an informed guess to write a recursive rule for each.



3. Imagine the graphs of the sequences generated by these recursive formulas. Describe each graph using exactly three of these terms: arithmetic, geometric, shifted geometric, linear, nonlinear, increasing, decreasing.

a.  $u_0 = 50$

$u_n = u_{n-1} - 10$  where  $n \geq 1$

c.  $u_0 = 35$

$u_n = u_{n-1} \cdot 1.75$  where  $n \geq 1$

e.  $u_0 = 5.0$

$u_n = 0.1 + u_{n-1}$  where  $n \geq 1$

b.  $u_0 = 1000$

$u_n = 0.7u_{n-1} + 100$  where  $n \geq 1$

d.  $u_0 = 150$

$u_n = (1 - 0.15)u_{n-1}$  where  $n \geq 1$

f.  $u_0 = 88$

$u_n = (1 + 0.3)u_{n-1} - 10$  where  $n \geq 1$