

**Grade Level/Course:** Algebra 1

**Activity/Lesson Name:** Search and Rescue Activity – Sequences

**Rationale/Lesson Abstract:** Students will review writing arithmetic and geometric sequences in both their recursive and explicit forms and will translate between the two forms.

**Timeframe:** 1 day (55 minutes)

**Common Core Standard(s):**

F-BF.2: Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.

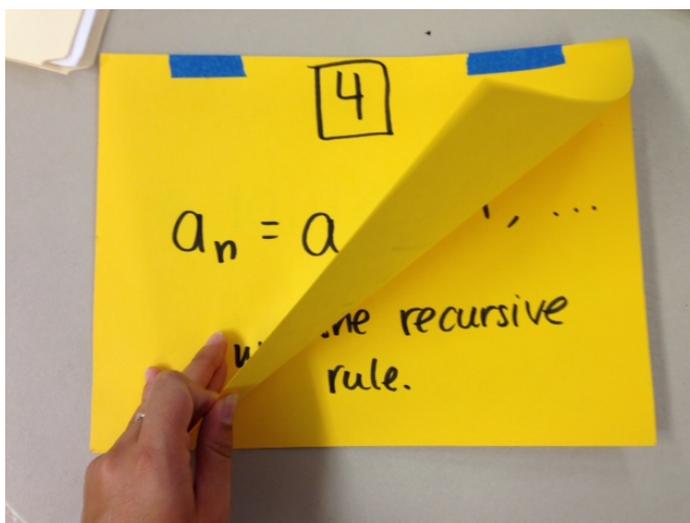
**Instructional Resources/Materials:**

- Search and Rescue Recording Sheet (page #4-5 of this lesson)
- 10 posters – each with an outside and inside page

The last 20 pages of the lesson are printable posters. There are two pages for each poster. You should tape these pages together along the top edge.

<div><p>4</p></div> <div><math display="block">a_n = a_{n-1} \cdot 8</math></div> <div><p>with <math>a_1 = 1</math></p></div>
<div><p>4</p></div> <div><p>8, 10, 12, 14, ... Find the recursive rule.</p></div>

The first page should be the outside/front/showing page and the second page should be covered on the inside. (As illustrated below.)



## Activity/Lesson:

The “Search and Rescue” activity can be applied to any topic that can be reviewed with a single question and single answer. The questions go on the inside of the posters, while the answers go on the outside.

Student Expectations (should be displayed on a poster or on the board while students work):

- Maximum of 3 students working together. (May be more if class size > 30.)
- Maximum of 3 students beginning at the same poster. (Again, may be more.)
- Show all work.
- Share your thought processes, not just answers.

To prepare students for this activity, their warm-up should be a review problem similar to those they will see on the posters. For this activity, I have included a table reviewing the different types of sequences and the general forms of their recursive and explicit formulas.

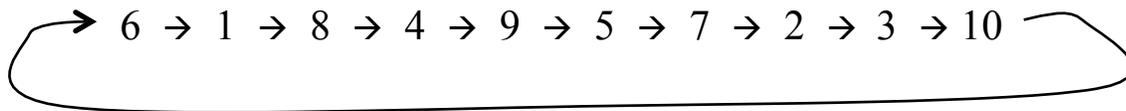
Type of Sequence	Recursive Formula	Explicit Formula
<p><b>Arithmetic</b></p> <p>Have a common difference,  <math>d = a_n - a_{n-1}</math></p>	<p>Given <math>a_1</math>,</p> $a_n = a_{n-1} + d$	$a_n = a_1 + d(n-1)$
<p><b>Geometric</b></p> <p>Have a common ratio <math>r = \frac{a_n}{a_{n-1}}</math></p>	<p>Given <math>a_1</math>,</p> $a_n = a_{n-1} \cdot r$	$a_n = a_1 \cdot r^{n-1}$

Each group of students should choose a poster at which to begin. Students record their starting poster number in the first column, ignore the outside of the poster, and record the problem given on the inside of the poster in the second column. After showing their work, students record their answer in the fourth column. Their answer should be found on the outside of a different poster around the room. Students then travel to that poster, record it’s number, and continue in the same way for all ten posters. (Recording worksheet should be filled out as demonstrated below.)

Problem #	What are you given?	Shown work on problem	Answer
Starting poster # goes here	Starting poster information goes here	Show your work	Answer goes here and should lead you to a new poster.
New poster # goes here	Etc.....		

Solutions:

The order for this correctly completed Search and Rescue is as follows:



Since the activity is circular, students can begin at any poster but should still follow this same order if they have done their work correctly. For example, if a student begins at poster 7, their solutions should be in the order 7, 2, 3, 10, 6, 1, 8, 4, 9, 5.

Scaffolding:

If a group of students is not prepared to work on their own (or with a small group), hold a tutorial where you are the “tour guide”. Have those students group with you and work with them through a few posters until you feel confident that they can continue to advance without you.

**Printable materials begin on NEXT PAGE.**

# Recording Sheet – Algebra 1

## SEARCH AND RESCUE!

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Example/Reference Sheet:

Type of Sequence	Recursive Formula	Explicit Formula
<b>Arithmetic</b> Have a common difference, $d = a_n - a_{n-1}$	Given $a_1$ , $a_n = a_{n-1} + d$	$a_n = a_1 + d(n-1)$
<b>Geometric</b> Have a common ratio $r = \frac{a_n}{a_{n-1}}$	Given $a_1$ , $a_n = a_{n-1} \cdot r$	$a_n = a_1 \cdot r^{n-1}$

Problem #	What are you given?	Shown work	Answer

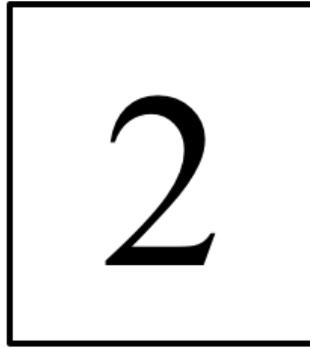

1

8, 16, 32, 64, ...

1

8, 16, 32, 64, ...

Find the recursive  
rule.



$$a_n = 8n + 2$$

$$\boxed{2}$$

$$a_n = (8)^{n-1}$$

Find the sequence.

3

1, 8, 64, 512, ...

3

10, 2, -6, -14, ...

Find the explicit  
rule.

4

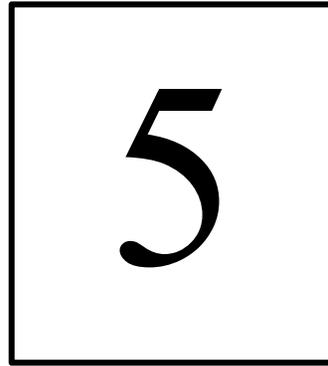
$$a_n = a_{n-1} \cdot 8$$

with  $a_1 = 1$

4

8, 10, 12, 14, ...

Find the recursive  
rule.



$$a_n = 8n - 7$$

5

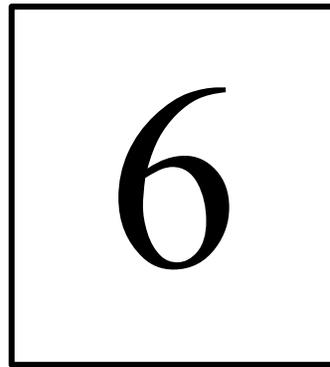
10, 18, 26, 34, ...

Find the recursive  
rule.

$$6$$

$$a_n = a_{n-1} - 8$$

with  $a_1 = 10$



$$a_n = 8 \cdot 2^{n-1}$$

Find the sequence.

$$\boxed{7}$$

$$a_n = a_{n-1} + 8$$

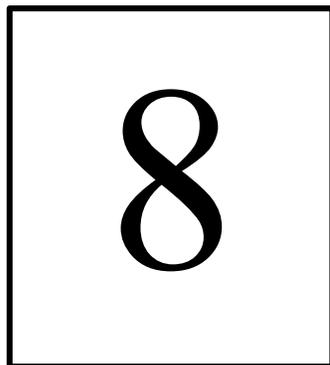
with  $a_1 = 10$

$$\boxed{7}$$

$$a_n = a_{n-1} + 8$$

$$\text{with } a_1 = 10$$

Find the explicit rule.



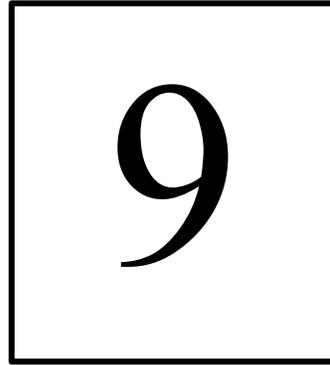
$$a_n = a_{n-1} \cdot 2$$

with  $a_1 = 8$

8

1, 8, 64, 512, ...

Find the recursive  
rule.



$$a_n = a_{n-1} + 2$$

with  $a_1 = 8$

9

1, 9, 17, 25, ...

Find the explicit  
rule.

10

$$a_n = -8n + 18$$

10

10, 2, -6, -14, ...

Find the recursive  
rule.