

Name: _____

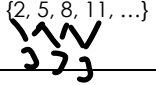
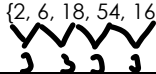
Date: _____

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

d

$$a_n = a_1(r)^{n-1}$$

Comparing Arithmetic vs Geometric

Description	Type	Formula	9th Term
{2, 5, 8, 11, ...} 	A	$a_n = a_1 + d(n-1)$ $a_n = 2 + 3(n-1)$ $a_n = 3n - 1$	$a_9 = 3(9) - 1$ $a_9 = 27 - 1 = 26$
{2, 6, 18, 54, 162, ...} 	G	$a_n = 2(3)^{n-1}$	$a_9 = 2(3)^{9-1}$ $a_9 = 13122$
A sequence has an initial value of $a_1 = 15$ and common ratio $r = 1.6$	G	$a_n = 15(1.6)^{n-1}$	$a_9 = 15(1.6)^{9-1}$ $a_9 = 644.25$
A sequence has an initial value of $a_1 = 14$ and common difference $d = 3$.	A	$a_n = 14 + 3(n-1)$ $a_n = 14 + 3n - 3$ $a_n = 3n + 11$	$a_9 = 3(9) + 11$ $a_9 = 27 + 11 = 38$
A gamer scores <u>1200 points</u> the first day she plays a game. Her score improves <u>300 points</u> every day thereafter.	A	$a_n = 1200 + 300(n-1)$ $a_n = 1200 + 300n - 300$ $a_n = 300n + 900$	$a_9 = 300(9) + 900$ $a_9 = 2700 + 900$ $a_9 = 3600$
Serena makes <u>\$7000</u> in sales of her biography the first day it is on sale. Her sales <u>increase 30%</u> each day after that.	G	$a_n = 7000(1.3)^{n-1}$	$a_9 = 7000(1.3)^{9-1}$ $a_9 = 57101.15$
A coffee shop sells <u>5 coffees</u> on the first day it is open, and its sales <u>triple</u> each day thereafter.	G	$a_n = 5(3)^{n-1}$	$a_9 = 32805$
A vending machine sells <u>4 candy bars</u> the first day it's installed, and its sales <u>increase by 5 candy bars</u> each day thereafter.	A	$a_n = 4 + 5(n-1)$ $a_n = 4 + 5n - 5$ $a_n = 5n - 1$	$a_9 = 5(9) - 1$ $a_9 = 44$
Mario is hiring for his Go-Kart team. He will give <u>3 gold coins</u> on the first day. Then, every day after, he will pay <u>3 times</u> as much as he paid the day before.	G	$a_n = 3(3)^{n-1}$	$a_9 = 19683$
Luigi is also hiring for his Go-Kart team. He will give <u>3 coins</u> on the first day, and then will pay you <u>20 more coins</u> each day after that.	A	$a_n = 3 + 20(n-1)$ $a_n = 3 + 20n - 20$ $a_n = 20n - 17$	$a_9 = 163$

Using your answers from the Mario and Luigi example above, answer the following questions.

Whom would you rather work for? Mario

Why? You make more money

Find the missing values for each arithmetic or geometric sequence. Determine whether it has a common difference or a common ratio. State the value of the common difference or ratio. Finally, identify if the sequence is arithmetic or geometric.

1. 5, 10, 15, 20, 25, 30, 35, ...

Common difference or ratio?

Common Difference/Ratio = +5

Arithmetic or geometric?

2. 20, 10, 5, 2.5, 1.25, ...

Common difference or ratio?

Common Difference/Ratio = 1/2

Arithmetic or geometric?

Determine whether the given information represents an arithmetic or geometric sequence. Then write the explicit equation for each.

3. 2, 4, 6, 8, ...

Arithmetic or geometric?

Explicit: $a_n = 2 + 2(n-1)$

$a_n = 2 + 2n - 2$

$a_n = 2n$

4. 2, 4, 8, 16, ...

Arithmetic or geometric?

Explicit: $a_n = 2(2)^{n-1}$

The yearbook staff is unpacking a box of school yearbooks. The sequence 281, 270, 259, 248, ... represents the total number of ounces that the box weighs as each yearbook is taken out.

5. What is the weight of each yearbook? 11 ounces

6. After 20 yearbooks were unpacked, how much did the box weigh?

$a_{20} = 281 - 11(20-1) = 72 \text{ ounces}$

7. If the full box of yearbooks weighs 292 ounces, how many yearbooks were in the box?

$292/11 = 26.54 \approx 26 \text{ yearbooks}$

Consider the following:

- **Option 1:** You can be paid \$20 an hour for 20 hours of work.
- **Option 2:** You can get \$1 the first hour, \$2 the second hour, \$4 the third hour, and \$8 the fourth hour. Your hourly rate would continue to double every hour. You are working 20 hours.

8. Write an explicit formula for each option.

Opt 1: $a_n = 20 + 20(n-1)$

$a_n = 20n$

Opt 2: $a_n = 1(2)^{n-1}$

9. Which option would you choose, and why?

Opt 1: $a_{20} = 20(20) = 400$

Opt 2: $a_{20} = 1(2)^{20-1} = 524288$

Opt 2 because you make more money.

10. If you only worked 10 hours would your answer be the same? Why?

Opt 1: $a_{10} = 20(10) = 200$

Opt 2: $a_{10} = 1(2)^{10-1} = 512$

Yes because you still make more money.