

Honors Algebra 2
Chapter 9 Review – Series & Sequences
Show all work!

Name: KEY

Date: _____ Period: _____

$$a_n = a_1 + (n-1) \cdot d \quad a_n = a_1 \cdot r^{n-1} \quad S_n = \frac{n}{2}(a_1 + a_n) \quad S_n = \frac{a_1(1-r^n)}{1-r} \quad S_n = \frac{a_1}{1-r}$$

- 1.) A recovering heart attack patient is told to get on a regular walking program. The patient is told to walk a distance of 5 km the first week, 8 km the second week, 11 km the third week and so on for a period of 10 weeks. 5, 8, 11

- a.) How far will the patient walk in the 10th week?

$$A_{10} = 5 + (10-1)(3)$$

$$A_{10} = 5 + (9)(3)$$

$$A_{10} = 32$$

32 KM

- b.) What is the total distance covered by the patient at the end of the 10th week?

$$S_{10} = \frac{10}{2}(5 + 32)$$

$$S_{10} = 5(37)$$

$$S_{10} = 185$$

185 KM

- 2.) A virus reproduces by dividing into two, and after a certain growth period, it divides into two again. As the virus continues to reproduce, it will continue to divide in two. How many viruses will be in a system starting with a single virus AFTER 10 divisions?

1 2 4 8 16

$$A_{10} = 1 \cdot 2^{10-1}$$

$$A_{10} = 1 \cdot 2^9$$

$$A_{10} = 512$$

- 3.) Amanda owes \$20,000 in interest free college loans. She is able to pay back the loan at a rate of 1.9% of the balance per month... 20,000 ; 19620 ; 19247.22 ; 18881.52

A₀

A₁

A₂

A₃

- a.) Is the following sequence Arithmetic or Geometric?

GEOMETRIC

- b.) State the common difference or common ratio.

$$\text{COMMON RATIO} = 0.981$$

.981

- c.) How much will she owe after her 21st payment?

$$A_{21} = 19620 (.981)^{21-1}$$

$$A_{21} = 13368.39$$

\$13,368.39

- 4.) Logs are stacked in a pile with 24 logs on the bottom row and 15 on the top row. There are 10 rows in all with each row having one more log than the one above it. How many logs are in the stack?

$$S_{10} = \frac{10}{2} (24 + 15)$$

195 LOGS

$$S_{10} = 5 (39)$$

$$S_{10} = 195$$

- 5.) A pile of bricks has 85 bricks in the bottom row, 79 bricks in the second row, 73 in the third row and so on until there is only 1 brick in the top row... $A_n = 85 + (n-1)(-6)$

- a.) How many bricks are in the 12th row?

$$A_{12} = 85 + (12-1)(-6) \rightarrow A_{12} = 19$$

$$A_{12} = 85 + (-66)$$

19 BRICKS

- b.) How many rows are there in all?

$$1 = 85 + (n-1)(-6) \rightarrow n = 15$$

$$-84 = -6n + 6$$

$$-90 = -6n$$

15 ROWS

- c.) How many total bricks are in the entire pile?

$$S_{15} = \frac{15}{2} (1 + 85) \rightarrow S_{15} = 645$$

$$S_{15} = \frac{15}{2} (86)$$

645 BRICKS

- 6.) The front row of a theater has 25 seats. Each of the other rows has two more seats than the row before it. How many seats are there altogether in the first 20 rows? 25, 27, 29, ...

$$A_{20} = 25 + (20-1)(2) \quad S_{20} = \frac{20}{2} (25 + 63)$$

$$A_{20} = 25 + 19(2)$$

$$S_{20} = 10 (88)$$

880 SEATS

$$A_{20} = 63$$

$$S_{20} = 880$$

- 7.) Juan has been saving money to buy a car. He put \$10 in a jar the first week, \$15 the second week, \$20 the third week, \$25 the fourth week and so on. How much money will Juan have saved in 1 year (52 weeks)?

$$A_{52} = 10 + (52-1)(5) \quad S_{52} = \frac{52}{2} (10 + 265) \rightarrow S_{52} = 7150$$

$$A_{52} = 10 + (51)(5)$$

$$S_{52} = \frac{52}{2} (275)$$

\$7150

$$A_{52} = 265$$

- 8.) 8, 6, 4.5, 3.375, 2.53125, ...

- a.) Arithmetic or Geometric: GEOMETRIC

- b.) Common Difference and/or Ratio: 0.75 or $\frac{3}{4}$

- c.) Next three terms: 1.8984375, 1.423828125, 1.067871094

- d.) Explicit Formula: $A_n = 8(.75)^{n-1}$

Evaluate each of the following.

9.)

$$\sum_{i=1}^{36} 2i - 9$$

$$S_{36} = \frac{36}{2} (-7 + 63)$$

$$S_{36} = 18(56)$$

$$S_{36} = 1008$$

10.)

$$\sum_{i=4}^{20} 2i - 9$$

$$S_{17} = \frac{17}{2} (-1 + 31)$$

$$S_{17} = \frac{17}{2} (30)$$

$$S_{17} = 255$$

11.)

$$\sum_{m=4}^{23} (2)(2)^{m-1}$$

$$S_{20} = \frac{16(1 - 2^{20})}{1 - 2}$$

$$S_{20} = 16,777,200$$

12.)

$$\sum_{x=3}^{15} \left(\frac{1}{3}\right)(3)^{x-1}$$

$$S_{13} = \frac{3(1 - 3^{13})}{1 - 3}$$

$$S_{13} = 2391483$$