

Name _____

Date _____

Advanced Algebra

Unit 1: Sequences and Series

Assignment #3

Use your calculator to "click it out" and find the 10th term of the following geometric terms.

$$1) \begin{cases} U_0 = 3 \\ U_n = 1.8 * U_{(n-1)} \\ n \geq 1 \end{cases} \quad y = 3(1.8)^x \quad \boxed{1071.14}$$

$$2) \begin{cases} U_0 = 2 \\ U_n = 3 * U_{(n-1)} \\ n \geq 1 \end{cases} \quad y = 2(3)^x \quad \boxed{118098}$$

$$3) \begin{cases} U_0 = 12 \\ U_n = .6 * U_{(n-1)} \\ n \geq 1 \end{cases} \quad y = 12(.6)^x \quad \boxed{.072559}$$

$$4) \begin{cases} U_0 = 4 \\ U_n = 3 * U_{(n-1)} \\ n \geq 1 \end{cases} \quad y = 4(3)^x \quad \boxed{236,196}$$

Write a direct formula in the form $y = U_0 * (r)^x$ for the given geometric sequences.

5) 3,9,27

Direct Formula:

$$y = 3 \cdot 3^x$$

What is the 8th term?

$$19683$$

6) 4,20,100

Direct Formula

$$y = 4 \cdot 5^x$$

What is the 6th term?

$$62,500$$

7) 200,160,128

$$y = 200(.8)^x$$

$$\frac{160}{200} = .8$$

$$\frac{128}{160} = .8$$

What is the 20th term?

$$2.3058$$

$$\begin{aligned}
 U_1 &= 12 \\
 U_2 &= 18 \\
 U_3 &= 24 \\
 U_4 &= 30
 \end{aligned}$$

$$\begin{aligned}
 U_1 &= 12 \\
 U_n &= U_{(n-1)} + 6 \quad n \geq 2
 \end{aligned}
 \quad > \quad \boxed{y = 6x + 6}$$

Assignment #3

- 8) After knee surgery, your trainer tell you to return to your jogging program slowly. He suggests jogging for 12 minutes each day for the first week. Each week thereafter he suggests you increase that time by 6 minutes. How many weeks will it be before you are up to jogging 60 minutes per day?

$$60 = 6x + 6$$

$$x = 9 \text{ weeks}$$

- 9) Joan made \$35,000 during the first year of her job. Each year she receives a 10% raise.

- a) Write a recursive formula for this scenario.

$$U_0 = 35,000$$

- b) Write the direct formula for this scenario.

$$U_n = 1.10 \cdot U_{(n-1)} \quad n \geq 1$$

$$y = 35,000 (1.10)^x$$

- c) How much money did she earn in her 10th year on the job?

$$\boxed{\$90,780.99}$$

- 10) A deposit is made in the bank. The APR (interest rate) is 4.25% compounded every year. The amount of the initial deposit was \$1,000.

- a) Write a recursive formula for this geometric scenario.

$$U_0 = 1,000$$

- b) Write the direct formula for this scenario.

$$U_n = (1.0425)^n \cdot U_{(n-1)} \quad n \geq 1$$

- c) Assuming the money is left in the account the entire time, how much money is in the account after 18 years?

$$1000 (1.0425)^{18}$$

$$\boxed{\$2115.29}$$

- 11) A new car will depreciate (go down in value) after it is bought. The depreciation rate is given by 2%. The purchase price of the new car was \$18,500. How much will the car be worth in 7 years?

- a) Write a recursive formula for this scenario.

$$\begin{aligned}
 U_0 &= 18,500 \\
 U_n &= (1 - .02)^n \cdot U_{(n-1)}
 \end{aligned}$$

- b) Write the direct formula for this scenario.

$$y = 18,500 (.98)^x$$

- c) How much will the car be worth in 7 years?

$$18,500 (.98)^7$$

$$\boxed{\$16,060.32}$$