

Name _____
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Date _____
Algebra II

Sequence/Series Review Sheet

Write an equation for each of the following sequences explicitly and recursively

1. 329.6, 376.8, 424, 471.2,...

2. 120, 192, 307.2, 491.52

3. 5400, 4050, 3037.5, 2278.125

4. 5205.20, 4208.15, 3211.1, 2214.05

5. If $a_n = 3a_{n-1} - 4$ and $a_1 = 9$, find a_5

6. Find the 8th term for the sequence where $a_n = 5a_{n-1} + 2$ where $a_5 = 3$

7. The average depreciation rate of a new boat is approximately 8% per year. If a new boat is purchased at a price of \$75,000, which model is a recursive formula representing the value of the boat n years after it was purchased?

1) $a_n = 75,000(0.08)^n$

3) $a_n = 75,000(1.08)^n$

2) $a_0 = 75,000$

4) $a_0 = 75,000$

$a_n = (0.92)^n$

$a_n = 0.92(a_{n-1})$

8. An initial investment of \$5000 in an account earns 3.5% annual interest. Which function correctly represents a recursive model of the investment after n years?

1) $A = 5000(0.035)^n$

3) $A = 5000(1.035)^n$

2) $a_0 = 5000$

4) $a_0 = 5000$

$a_n = a_{n-1}(0.035)$

$a_n = a_{n-1}(1.035)$

9. Write a recursive formula for the sequence 6, 9, 13.5, 20.25, ...

10. Write a recursive formula for the sequence 189, 63, 21, 7, ...

11. Kina earns a \$27,000 salary for the first year of work at her job. She earns annual increases of 2.5%. What is the total amount, to the *nearest cent*, that Kina will earn for the first eight years at this job?

12. A fisherman harvests 350 kilograms of crab on Monday. From Monday to Friday, the fisherman harvests 8% less kilograms of crab per day. To the *nearest tenth of a kilogram*, what is the total amount of crab harvested between Monday and Friday?

13. Kristin wants to increase her running endurance. According to experts, a gradual mileage increase of 10% per week can reduce the risk of injury. If Kristin runs 8 miles in week one, which expression can help her find the total number of miles she will have run over the course of her 6-week training program?

1) $\sum_{n=1}^6 8(1.10)^{n-1}$

2) $\sum_{n=1}^6 8(1.10)^n$

3) $\frac{8 - 8(1.10)^6}{0.90}$

4) $\frac{8 - 8(0.10)^n}{1.10}$

14. In his first year running track, Brendon earned 8 medals. He increases his amount of medals by 25% each year. Which of the following expressions can be used to determine how many total medals Brendon will have after four years of high school?

1) $\frac{8 - 8(0.25)^4}{-.25}$

3) $\frac{8 - 8(1.25)^4}{1 - .25}$

2) $\sum_{n=1}^4 8(0.25)^{n-1}$

4) $\sum_{n=1}^4 8(1.25)^{n-1}$

Algebraically solve for all values of x

15. $x = 1 + \sqrt{x+5}$

16. $3 = -x + \sqrt{x+5}$

17. Mr. and Mrs. Jenkins just closed on a new home whose purchase price was \$380,000. At the closing, they supplied a down payment of \$76,000. If on the day of the closing the monthly interest rate was .3125%, determine the Jenkins' monthly mortgage payment, to the *nearest cent*, if they were approved for a 30-year loan.

Use the formula $M = P \cdot \frac{r(1+r)^n}{(1+r)^n - 1}$ where M is the mortgage payment, P is the principal amount of the loan, r is the monthly interest rate, and n is the number of monthly payments.

18. Monthly mortgage payments can be found using the formula below:

$$M = \frac{P \left(\frac{r}{12} \right) \left(1 + \frac{r}{12} \right)^n}{\left(1 + \frac{r}{12} \right)^n - 1}$$

M = monthly payment

P = amount borrowed

r = annual interest rate

n = number of monthly payments

The Banks family would like to borrow \$120,000 to purchase a home. They qualified for an annual interest rate of 4.8%. If they plan to spend 15 years to repay the loan, what will be the monthly payment rounded to the *nearest cent*?

19. Which expression is equivalent to $2xy^2\sqrt[3]{x^2y}$?

1) $2x^{\frac{5}{3}}y^{\frac{7}{3}}$

3) $2x^{\frac{2}{3}}y^{\frac{2}{3}}$

2) $2xy$

4) $2x^7y^4$

20. Which equation is equivalent to $P = 210x^{\frac{4}{3}}y^{\frac{7}{3}}$?

1) $P = \sqrt[3]{210x^4y^7}$

3) $P = 210xy^2\sqrt[3]{xy}$

2) $P = 70xy^2\sqrt[3]{xy}$

4) $P = 210xy^2\sqrt[3]{x^3y^5}$

21. Which is the solution to: $1 - 2(5)^{2x} = -5$?

1) $\frac{\ln 6}{2 \ln 3}$

3) $\frac{2 \ln 4}{\ln 3}$

2) $\frac{2 \ln 5}{\ln 1}$

4) $\frac{\ln 3}{2 \ln 5}$

22. Which is the solution to: $5(3)^{2x} = 30$?

1) $\frac{\log 6}{3 \log 2}$

3) $\frac{2 \log 6}{\log 3}$

2) $\frac{\log 6}{2 \log 3}$

4) $\frac{2 \log 3}{\log 6}$

Express in simplest form with a rational exponent:

23. $\sqrt[5]{x^2} \cdot \sqrt{x^3}$

24. $\sqrt[4]{a^7} \cdot \sqrt{a^5}$