Algebra 2 KEY Name _____ (1)

Series and Sequences REVIEW Per. _____

Determine whether each sequence is arithmetic, geometric, or neither. If it is arithmetic or geometric, determine the equation for the n^{th} term of each sequence and find a_{10}.

1. 1, 3, 6, 10, 15, ...

Neither

2. 40, 43, 46, 49, 52, ...

Arith $a_n = 40 + 3(n-1)$ $a_{10} = 40 + 3(10-1) = 67$

3. $4, \frac{13}{3}, \frac{14}{3}, 5, \frac{16}{3}, \ldots$

Arith $a_n = 4 + \frac{1}{3}(n-1)$ $a_{10} = 7$

4. -4, 12, -36, 108, -324, ...

Geo $a_n = -4(-3)^{n-1}$ $a_{10} = 78732$

5. 4, 16, 36, 64, 100, ...

Neither

6. 1, 5, 25, 125, 625, ...

Geo $a_n = 1(5)^{n-1}$ $a_{10} = 1953125$

7. -29, -34, -39, -44, -49, ...

Arith $a_n = -29 + (-5)(n-1)$ $a_{10} = -79$

8. 1, 4, 9, 16, 25, ...

neither

9. -34, -26, -18, -10, -2, ...

Arith $a_n = -34 + 8(n-1)$ $a_{10} = 38$

10. 0, 3, 8, 15, 24, ...

neither

Write a recursive formula for each sequence, then find the next three terms.

11. 2, -6, 18, -54, 162, ... $-486, 1458, -4374$

$a_1 = 2$

$a_n = (a_{n-1}) \cdot (-3)$

12. 15, 215, 415, 615, 815, ... $1015, 1215, 1415$

$a_1 = 15$

$a_n = (a_{n-1}) + 200$

13. 96, 12, $\frac{3}{2}, \frac{3}{16}, \frac{3}{128}$, ... $\frac{3}{1024}, \frac{3}{8192}, \frac{3}{65536}$

$a_1 = 96$

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

14. 9, 5, 1, -3, -7, ... $-11, -15, -19$

$a_1 = 9$

$a_n = (a_{n-1}) - 4$

Key Exam 2 Review (3)

Find the sum of each geometric series.

15. $\sum_{n=1}^{8} 2 \cdot (-2)^{n-2}$

85

16. $\sum_{n=1}^{10} 4 \cdot (-3)^{n-1}$

-59048

17. $\sum_{k=1}^{8} (-6)^{k-1}$

-239945

18. $\sum_{k=1}^{4} 4^{k-1}$

85

19. The label on Pete's blue jeans states that, when washed, the jeans will lose 5% of their color. How much of the original color will be left after 8 washings?

$1(0.95)^{8-1} = 0.698$

$\approx 70\%$

20. Todd joins a fitness club. After the first week of training, his biceps increase by 4 millimeters. The trainer says Todd can expect his biceps to continue to increase each week, but only by about 90% of the increase of the week before. How much will Todd's biceps have increased after 8 weeks?

$4(1+0.9)^{8-1} \approx 357.55$ mm

Key Review Exam E - (4)

21. Violet looks at the table of contents in her book. She sees that each of the first 6 chapters is 2 pages longer than the preceding chapter, with the first chapter having 10 pages.
    a. How many pages are in the sixth chapter?

$$10 + 2(6-1) = 20$$

    b. How many pages are in the first 6 chapters?

$$\sum_{n=1}^{6} 10 + 2(n-1) = 90$$

22. Jackson usually runs 8 laps around the football field and consistently completes the first lap in 3 minutes. During one practice session, his coach notes that it take him 15% longer to complete each lap than the previous lap.
    a. How long does it take Jackson to complete the eighth lap?

$$3(1+0.15)^{8-1} \approx 8 \text{ min}$$

    b. How long does it take Jackson to complete all eight laps?

$$\sum_{n=1}^{8} (3(1+0.15)^{n-1} \approx 41.18 \text{ min}$$

23. A new Camry costs about $23, 000 and depreciates by a rate of 5% per year, whereas a new Fusion costs about $21, 000 and depreciates by a rate of 7% per year. After 5 years, what is the difference in the values of the Camry and Fusion?

$$\text{Camry} = 23000(0.95)^{5-1} = 18733.60$$

$$\text{Fusion} = 21000(0.93)^{5-1} = 15709.10$$

$$\Delta \approx \$3024.55 \text{ for Camry}$$

24. To buy a new car, John took out a 5 year loan of $18,000 with a 3% annual interest rate compounded yearly from a dealership. How much will John have paid the dealership at the end of the loan?

$A = P\left(1 + \frac{r}{n}\right)^{nt}$

$$18000\left(1 + \frac{0.03}{1}\right)^{1\cdot 5} = \$20866.90$$