Precalculus 10.3 Homework

Name _____ period _____ date _____ score_____

Determine algebraically whether the sequence is arithmetic, geometric, or neither. If it is arithmetic, find the common difference. If it is geometric, find the common ratio.

1. $\{a_n\} = \{-2n^2\}$

2. $\{a_n\} = \left\{\frac{2^{n-1}}{4}\right\}$

3. $\{a_n\} = \{3-5n\}$

Find the fifth term and the nth term of each geometric sequence.

4. $a_1 = 6,\ r = -2$

5. $a_1 = 12,\ r = \frac{1}{4}$

6. $a_1 = 0,\ r = \pi$

Find the indicated term of each geometric sequence.

7. 7^{th} term of $1, \frac{1}{2}, \frac{1}{4}, \ldots$

8. 8^{th} term of $25, -15, 9, \ldots$

9. 9^{th} term of $3, 6, 12, \ldots$

Find the nth term of each geometric sequence.

10. $-4, 1, -\frac{1}{4}, \frac{1}{16}, \ldots$

11. $a_6 = 243,\ r = -3$

12. $a_2 = 7,\ a_4 = 1575$

Find each sum.

13. $\frac{4}{5}+\frac{4^2}{5}+\frac{4^3}{5}+...+\frac{4^9}{5}$

14. $-1-2-4-8-...-2^{12}$

15. $\sum_{k=1}^{10} 3\cdot 5^{k-1}$

16. $\sum_{k=1}^{12} 6\left(-\frac{2}{3}\right)^k$

17. $3+\frac{6}{7}+\frac{12}{49}+...+3\left(\frac{2}{7}\right)^8$

Determine whether each infinite geometric series converges or diverges. If it converges, find its sum.

18. $6+2+\frac{2}{3}+...$

19. $8+12+18+27+...$

20. $2-\frac{1}{2}+\frac{1}{8}-\frac{1}{32}+...$

21. $\sum_{k=1}^{\infty} 8\left(\frac{1}{3}\right)^{k-1}$

22. $\sum_{k=1}^{\infty} \frac{1}{2}(-2)^{k-1}$

23. $\sum_{k=1}^{\infty} 10\left(-\frac{2}{5}\right)^k$

Solve the problem.

24. A ball is dropped from a height of 30 feet. Each time it strikes the ground, it bounces up to 0.8 of the previous height.
    a. What height will the ball bounce up to after it strikes the ground for the third time?
    b. How high will it bounce after it strikes the ground for the nth time?
    c. What total distance does the ball travel before it stops bouncing?

25. In an old fable, a commoner who had saved the king's life was told he could as the king for any just reward. Being a shrewd man, the commoner said, "A simple wish, sire. Place one grain of wheat on the first square of a chessboard, two grains on the second square, four grains on the third square, continuing until you have filled the board. This is all I seek." Compute the total number of grains needed to do this to see why the request, seemingly simple, could not be granted. (A chessboard has 64 squares.)