

PreCalculus Test

Your Name:

(1-4) Find the first four terms as well as the tenth term of the sequence with the given n th term.

1. $a_n = (-2)^n + 3$

2. $a_n = \frac{3^{n-1}}{n^2}$

3. $a_n = n! - 1$

4. $a_n = a_{n-1} + 2n - 5$

$a_1 = -2$

(5-8) Is the sequence arithmetic or geometric? Find the common difference or the common ratio.

5. $a_n = 4n - 1$

6. $\{1000, 100, 10, 1, \dots\}$

7. $\{128, 117, 106, 95, \dots\}$

8. $a_n = 16(5)^{n-1}$

9. The first term of a geometric sequence is 16 and the fifth term is $1/16$. Find the common ratio and the ninth term.

10. The second term of an arithmetic sequence is 10 and the seventh term is 28. Find the common difference and the sixteenth term.

11. The first term of an arithmetic sequence is 9 and the fourth term is 6. Find the partial sum of the first twelve terms.

12. Find the sum:
 $\frac{1}{2} + \frac{2}{5} + \frac{8}{25} + \dots + \frac{2048}{15625}$

13. Find the sum of the infinite series:
 $20 + \frac{40}{3} + \frac{80}{9} + \frac{160}{27} + \dots$

$$A_f = R \frac{(1+i)^n - 1}{i}$$

$$A_p = R \frac{1 - (1+i)^{-n}}{i}$$

14. After eight years during which I deposited the same amount of money, x , every month into my bank account, the balance in the account is \$12,572. If the account has an annual interest rate of 6%, compounded monthly, what is x ?

(15-17) Use the principle of induction to prove the statement. Show all work.

15.
$$\frac{1}{1 \cdot 3} + \frac{1}{3 \cdot 5} + \frac{1}{5 \cdot 7} + \cdots + \frac{1}{(2n-1)(2n+1)} = \frac{n}{2n+1}$$

16.
$$1^2 + 2^2 + 3^2 + \cdots + n^2 = \frac{n(n+1)(2n+1)}{6}$$

17. $8^n - 1$ is divisible by 7 for all natural numbers n .

18. Outline the steps necessary to prove the binomial theorem by induction.

19. Expand $(s - 5t)^6$.

20. Find the fifth term in the binomial expansion of $(2x + 3y)^{12}$.

21. Find the ninth term in the binomial expansion of $(6 - 2p)^{10}$.

