MU ALPHA THETA - MAINE '95 THETA - SERIES AND SEQUENCES TOPIC TEST

1. The 71st term of 30, 27, 24, 21, ... is

a. 180 b. -183 c. -180 d. -120 e. not given

2. From which of the following can we conclude that a, b, c is an arithmetic sequence?

a. $a + b = b + c$ b. $a + b = 2c$ c. $b - a = c - b$
d. $\frac{b}{a} = \frac{c}{b}$ e. not given

3. Which of the following is the eighth term of the sequence: $1, \frac{\sqrt{3}}{2}, \frac{3}{4}, \ldots$

a. $\frac{2+7\sqrt{3}}{2}$ b. $\frac{3\sqrt{3}}{8}$ c. $\frac{27}{64}$ d. $\frac{27\sqrt{3}}{128}$ e. not given

4. If nine arihtmetic means are to be inserted between 6 and 20, one of them will be

a. 7 b. $7\frac{3}{11}$ c. 10 d. 10.2 e. not given

5. Find the sum of the odd integers between 10 and 50.

a. 600 b. 540 c. 900 d. 450 e. not given

6. Find the middle term for which the sequence $k - 3$, $k + 5$, $2k - 1$ is an arithmetic progression.

a. 22 b. 19 c. 17 d. 14 e. not given

7. The first term of an infinite geometric sequence is 99. If the infinite sum of all the terms of this sequence is 297, what is the common ratio?

a. $\frac{-3}{4}$ b. $\frac{-2}{3}$ c. $\frac{2}{3}$ d. $\frac{3}{4}$ e. not given

8. What is the sixth term of the arithmetic sequence whose 31st and 73rd terms are 18 and 46 respectively?

a. $\frac{2}{3}$ b. -2 c. $\frac{4}{3}$ d. $\frac{-1}{3}$ e. not given

9. An arithmetic sequence 's constant difference is -8. Its 7th term is 252. which term has a value of 76?

a. 29 b. 30 c. 31 d. 32 e. not given

10. A theater has 20 seats in the first row, 24 seats in the second row, 28 in the third row, 32 in the 4th, and so on. How many rows make up 800 seats?

a. 13 b. 14 c. 15 d. 16 e. not given

11. Solve for y: $3 = \cfrac{y}{y+\cfrac{y}{y+\cfrac{y}{y+\ldots}}}$

a. 9 b. -4.5 c. 1 d. -9 e. not given

12. Which one of the following could be the value of a so $2a - 1, 4a + 1, 15a - 3$ is a geometric sequence?

a. 1 b. 2 c. 3 d. 4 e. not given

13. Given the sequence: **x, y, 11, 26, 63, ...**
Each term, starting with the third is formed by doubling the previous term, then adding the term before that one. Find the value of $\mathbf{x + y}$.

a. 5 b. 6 c. 7 d. 8 e. not given

14. For what value of x does $1 + x + x^2 + x^3 + \ldots = 4$?

a. $\frac{4}{5}$ b. $\frac{3}{4}$ c. $\frac{-3}{4}$ d. $\frac{-4}{5}$ e. not given

15. Find the sum of the following progression: $-88 - 85 - 82 \ldots + 275 + 278$

a. 11,495 b. 11,685 c. 22,140 d. 22,509 e. not given

16. If $3x - 1, x + 8, -2x + 14$ forms an arithmetic sequence, then find the numerical value of the 6th term.

a. 149 b. 65 c. 33 d. 23 e. not given

17. If the first four terms of an arithmetic sequence are a, x, b, 2x, then find the ratio of a to b.
a. $\frac{1}{3}$ b. $\frac{1}{2}$ c. $\frac{3}{5}$ d. $\frac{3}{4}$ e. not given

18. If $900 is invested at five percent annual interest and this amount is compounded semiannually, find the total amount apayable to the investor to the nearest dollar after 1.5 years.

a. $945 b. $968 c. $969 d. $990 e. not given

19. Given the sequence: **1, 1, 3, 4, 5, 7, 7, 10, 9, 13, 11, 16, ...**
Find the 28th term in this sequence.

a. 27 b. 31 c. 40 d. 43 e. not given

20. Find the sum to infinity of $\frac{1}{7}+\frac{2}{7^2}+\frac{1}{7^3}+\frac{2}{7^4}+\ldots$

a. $\frac{1}{6}$ b. $\frac{1}{48}$ c. $\frac{4}{21}$ d. $\frac{3}{16}$ e. not given

21. The following sum: 32 - 16 + 8 - 4 + 2 -1 written in summation notation is

a. $\sum_{i=1}^{5}(-1)^i 2^{5-i}$ b. $\sum_{i=5}^{10}(-2)^{-i}$ c. $\sum_{i=0}^{5}2^{5-i}$ d. $\sum_{i=0}^{5}(-32)\left(\frac{1}{2}\right)^i$ e. not given

22. If a rubber ball is dropped from a height of one yard and continues to rebound to a height which is nine-tenths of its previous fall, find the total distance in yards that it travels on falls only.

a. $\frac{81}{100}$ b. 1 c. 9 d. 10 e. not given

23. If three positive geometric means are inserted between 4 and 20.25, then what is the sum of these three positive geometric means?

a. 18 b. 22.5 c. 27 d. 28.5 e. not given

24. Find the seventh term of the following geometric sequence:
-85293, 28431, -9477

a. -351 b. -117 c. -39 d. -13 e. not given

25. Find the 31st term in the sequence: **97, 81, 80, 54, 63, 36, 46, 24, 29, 16, 12,...**

a. -158 b. -141 c. -137 d. -119 e. not given

26. Which one of the following series has 35 as its sum?

a. $\sum_{k=3}^{7}(k+2)$ b. $\sum_{k=1}^{4}(k^2+\frac{1}{k})$ c. $\sum_{k=2}^{8}\left(k+\frac{k}{2}\right)$ d. $\sum_{k=3}^{5}\left(\frac{k-2}{3}\right)$ e. not given

27. What is the sum of the three arithmetic means between $3\frac{1}{2}$ and $12\frac{5}{6}$?

a. $23\frac{5}{14}$ b. $24\frac{1}{2}$ c. $25\frac{1}{6}$ d. $31\frac{5}{6}$ e. not given

28. Which one of the following is an arithmetic series of 21 terms with a sum of 10.5 and a common difference of -3?

a. $30.5 + 27.5 + 24.5 + \ldots + (-29.5)$
b. $(-29.5) + (-32.5) + (-35.5) + \ldots + 30.5$
c. $24.5 + 27.5 + 30.5 + \ldots + (-29.5)$
d. $(24.5 + 21.5 + 18.5 + \ldots + (-30.5)$
e. not given

29. Given equilateral triangle ABC of side 5. The midpoints of the sides are joined to form Triangle DEF; the midpoints of Triangle DEF are then joined to form Triangle GHI, and this process is continued indefinitely. The sum of the perimeters of all the triangles formed is

a. 30 b. 25 c. 35 d. 38 e. not given

30. How many zeros are there altogether between the decimal point and the one hundredth five in the following sequence: 0.05005000500005... ?

a. 4950 b. 5000 c. 5050 d. 5100 e. not given