Review for Quiz over 8.1, 9.1, 9.2 Name_____

**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**

**...nd the first five terms of the sequence with specified nth term.**

1) $a_n = (-1)^n(n^3 + 1)$ 1) _____

A) $-2, 9, -28, 65, -126$ B) $0, -7, 26, -63, 124$

C) $2, 9, 28, 65, 126$ D) $0, 7, -26, 63, -124$

**Find the indicated term for the sequence.**

2) $a_n = \frac{1}{n^2}$; $a_7$ 2) _____

A) 49 B) $\frac{1}{14}$ C) $\frac{2}{7}$ D) $\frac{1}{49}$

**Find the first five terms of the recursively defined sequence.**

3) $a_1 = 6$, $a_n = (-1)^{n-1}a_{n-1}$ for all $n \geq 2$ 3) _____

A) $-6, 6, -6, 6, -6$ B) $6, 6, -6, -6, 6$ C) $6, -6, 6, -6, 6$ D) $6, -6, -6, 6, 6$

**Solve the problem.**

4) The 5th and 9th terms of an arithmetic sequence are -12 and -36 respectively. Find the first term and an explicit rule for the nth term. 4) _____

A) $a_1 = 12$; $a_n = 6n + 18$ for all $n \geq 1$ B) $a_1 = 12$; $a_n = -6n + 12$ for all $n \geq 1$

C) $a_1 = 6$; $a_n = -6n + 12$ for all $n \geq 1$ D) $a_1 = 12$; $a_n = -6n + 18$ for all $n \geq 1$

**...d a recursive rule for the nth term of the given arithmetic sequence.**

5) 1, 4/3, 5/3, 2, .... 5) _____

A) $a_n = a_{n-1} + \frac{4}{3}$ B) $a_n = a_{n-1} + \frac{1}{3}$ C) $a_n = n + \frac{1}{3}$ D) $a_n = a_{n-1} - \frac{1}{3}$

**Solve the problem.**

6) The 5th and 8th terms of a geometric sequence are 878 and 878,000 respectively. Find the first term, common ratio, and an explicit rule for the nth term. 6) _____

A) $a_1 = 0.00878$; $r = 10$; $a_n = 0.0878(10)^{n-1}$ for all $n \geq 1$

B) $a_1 = 0.0878$; $r = 100$; $a_n = 0.0878(100)^{n-1}$ for all $n \geq 1$

C) $a_1 = 0.0878$; $r = 10$; $a_n = 0.0878(10)^n$ for all $n \geq 1$

D) $a_1 = 0.0878$; $r = 10$; $a_n = 0.0878(10)^{n-1}$ for all $n \geq 1$

**Find a recursive rule for the nth term of the given geometric sequence.**

7) $\frac{3}{2}, \frac{3}{4}, \frac{3}{8}, \frac{3}{16}, \frac{3}{32}, \ldots$ 7) _____

A) $a_n = 2a_{n-1}$ B) $a_n = \frac{3}{2}a_{n-1}$ C) $a_n = \frac{1}{2}n$ D) $a_n = \frac{1}{2}a_{n-1}$

**Find the limit of the sequence if it converges; otherwise indicate divergence.**

8) $a_n = 6 + (1.5)^n$ 8) _____

A) 6 B) 1.5 C) 7.5 D) Diverges

9) $a_n = \frac{8 + 9n}{4 + 8n}$ 9) _____

A) 2 B) 28 C) $\frac{9}{8}$ D) Diverges

10) $a_n = (-1)^n \frac{9}{n}$ 10) _____

A) 9 B) ±9 C) 0 D) Diverges

11) $a_n = \frac{6 + (-1)^n}{6}$ 11) _____

A) $\frac{7}{6}$ B) 0 C) 1 D) Diverges

**Write an expression for the nth term, $a_n$.**

12) $\sum_{n=1}^{\infty} a_n = 7 + \frac{7}{4} + \frac{7}{9} + \frac{7}{16} + \ldots$ 12) _____

A) $\frac{7}{2^n}$ B) $\frac{7}{n^2}$ C) $(\frac{7}{n})^2$ D) $\frac{7}{n^3}$

**Determine whether the given series converges or diverges, and find the sum if it converges.**

13) $4 + 12 + 36 + 108 + \ldots$ 13) _____

A) Converges; sum = 108
B) Converges; sum = 113
C) Converges; sum = 160
D) Diverges

14) $5 + 1 + 0.2 + 0.04 + \ldots$ 14) _____

A) Converges; sum = 6.25
B) Converges; sum = 3.75
C) Converges; sum = 9.375
D) Diverges

15) $\sum_{n=1}^{\infty} \left(\frac{1}{10}\right)^n$ 15) _____

A) Converges; sum = $\frac{10}{9}$ B) Converges; sum = $-\frac{1}{9}$

C) Converges; sum = $\frac{1}{9}$ D) Diverges

**Solve the problem.**

16) Find the value of b for which 16) _____

$1 - e^b + e^{2b} - e^{3b} + \ldots = \frac{1}{5}$.

A) ln 4 B) $\ln \frac{5}{6}$ C) ln 5 D) ln 6

17) For what value of r does the infinite series 17) _____

$1 + 8r + 3r^2 + 8r^3 + r^4 + 8r^5 + 3r^6 + 8r^7 + r^8 + \ldots$

converge?

A) $|r| < \frac{8}{3}$ B) $|r| < \frac{11}{2}$ C) $|r| < 1$ D) $|r| < \frac{3}{8}$

**Find the values of x for which the geometric series converges.**

18) $\sum_{n=0}^{\infty} \left(\frac{x-9}{2}\right)^n$ 18) _____

A) $5 < x < 13$ B) $-5 < x < 13$ C) $-11 < x < 11$ D) $7 < x < 11$

**Find the function which is represented by the given series for those x for which the series converges..**

19) $\sum_{n=0}^{\infty} -8^n x^n$ 19) _____

A) $f(x) = \frac{1}{1+8x}$ B) $f(x) = \frac{8}{1-8x}$ C) $f(x) = \frac{1}{1-8x}$ D) $f(x) = \frac{8}{1+8x}$

20) $\sum_{n=0}^{\infty} \left(\frac{x-6}{9}\right)^n$ 20) _____

A) $\frac{6}{15+x}$ B) $\frac{9}{15-x}$ C) $\frac{9}{15+x}$ D) $\frac{6}{15-x}$

**Solve the problem.**

21) Find the sum of the series $\sum_{n=1}^{\infty} \frac{n}{4^{n-1}}$ by expressing $\frac{1}{1-x}$ as a geometric series, differentiating both 21) _____

sides of the resulting equation with respect to x, and replacing x by $\frac{1}{4}$.

A) $\frac{25}{16}$ B) $\frac{9}{16}$ C) $\frac{16}{25}$ D) $\frac{16}{9}$

22) If the series $\sum_{n=0}^{\infty} (-1)^n (x+2)^n$ is integrated term by term, for what value(s) of x does the new 22) _____

series converge?

A) $-3 < x < -1$ B) $-3 < x \leq -1$ C) $-3 \leq x \leq -1$ D) $-3 \leq x < -1$

**Find the Taylor polynomial of third order for the function at x = 0.**

23) $f(x) = e^{-7x}$ 23) _____

A) $1 - 7x + \frac{49x^2}{2} - \frac{343x^3}{3}$ B) $1 - 7x + \frac{49x^2}{2} - \frac{343x^3}{6}$

C) $1 - 49x + \frac{2401x^2}{2} - \frac{117{,}649x^3}{12}$ D) $1 - 7x + \frac{49x^2}{2} - \frac{343x^3}{18}$

**Find the first four nonzero terms of the Maclaurin expansion of the given function.**

24) $f(x) = \cos x^5$ 24) _____

A) $1 + 5x + \frac{5x^2}{2!} + \frac{5x^3}{3!} + \ldots$

B) $1 - x^5 + \frac{2x^{10}}{3} - \frac{x^{20}}{120} + \ldots$

C) $x + 5x + \frac{5x^2}{2!} + \frac{5x^3}{3!} + \ldots$

D) $1 - \frac{x^{10}}{2!} + \frac{x^{20}}{4!} - \frac{x^{30}}{6!} + \ldots$

**Find the general term of the Maclaurin series for the given function.**

25) $\sin 10x$ 25) _____

A) $\sum_{n=0}^{\infty} \frac{(-1)^{2n+1}\, 10^{2n+1}\, x^{2n+1}}{(2n+1)!}$

B) $\sum_{n=0}^{\infty} \frac{(-1)^n\, 10^{2n+1}\, x^{2n+1}}{n!}$

C) $\sum_{n=0}^{\infty} \frac{(-1)^n\, 10^{2n+1}\, x^{2n+1}}{(2n+1)!}$

D) $\sum_{n=0}^{\infty} \frac{(-1)^{2n+1}\, 10^{2n+1}\, x^{2n+1}}{n!}$

**Find the Taylor series generated by f at x = a.**

26) $f(x) = e^x,\ a = 4$ 26) _____

A) $\sum_{n=0}^{\infty} \frac{e^4\,(x-4)^n}{(n+1)!}$

B) $\sum_{n=0}^{\infty} \frac{e^4\,(x-4)^{n+1}}{n!}$

C) $\sum_{n=0}^{\infty} \frac{e^4\,(x-4)^{n+1}}{(n+1)!}$

D) $\sum_{n=0}^{\infty} \frac{e^4\,(x-4)^n}{n!}$

**Find the Taylor polynomial of order 3 generated by f at x = a.**

27) $f(x) = x^3,\ a = 3$ 27) _____

A) $6 + 3(x-9) + (x-9)^2 + (x-9)^3$

B) $108 + 27(x-9) + 6(x-9)^2 + (x-9)^3$

C) $27 + 27(x-3) + 9(x-3)^2 + (x-3)^3$

D) $27 + 9(x-9) + 9(x-9)^2 + (x-9)^3$

**Approximate the given function by using the third order Taylor polynomial.**

28) $\ln 0.78$ 28) _____

A) $-0.2477$

B) $-0.4557$

C) $-0.3007$

D) $0.7523$