Honors PreCalculus Name KEY

Unit 7 - Practice Quiz

Date _____

For each sequence, state if it is arithmetic, geometric, or neither.

1) 125, 25, 5, 1, $\frac{1}{5}$, ... (÷5, ÷5)

A) Neither B) Arithmetic
C) Geometric

2) 1, 2, 4, 8, 16, ... (*2, *2)

A) Arithmetic B) Neither
C) Geometric

3) 4, 6, 9, 13, 18, ...

A) Arithmetic B) Neither
C) Geometric

4) −9, 91, 191, 291, 391, ... (+100, +100)

A) Geometric B) Arithmetic
C) Neither

For each arithmetic sequence, find the common difference, the explicit formula, and the recursive formula.

5) −10, −30, −50, −70, ...

$d = -20$

explicit: $a_n = 10 - 20n$

recursive: $\begin{cases} a_1 = -10 \\ a_n = a_{n-1} - 20 \end{cases}$

6) −20, −10, 0, 10, ...

$d = 10$

explicit: $a_n = 10n - 30$

recursive: $\begin{cases} a_1 = -20 \\ a_n = a_{n-1} + 10 \end{cases}$

For each geometric sequence, find the common ratio, the explicit formula, and the recursive formula.

7) 1, 6, 36, 216, ...

$r = 6$

explicit: $a_n = 6^{n-1} * 1$

recursive: $\begin{cases} a_1 = 1 \\ a_n = a_{n-1} * 6 \end{cases}$

8) 4, 12, 36, 108, ...

$r = 3$

explicit: $a_n = 3^{n-1} * 4$

recursive: $\begin{cases} a_1 = 4 \\ a_n = a_{n-1} * 3 \end{cases}$

Evaluate each series.

9) $\sum_{n=1}^{7}(n+100) =$ 728

$= (1+100)+(2+100)+(3+100)+\ldots+(7+100)$

10) $\sum_{a=1}^{6} a(a-1) =$ 70

$= 1(1-1)+2(2-1)+3(3-1)+4(4-1)\ldots+6(6-1)$

11) $\sum_{n=0}^{6} 3n^2 =$ 273

$= 3(0)^2+3(1)^2+3(2)^2+\ldots+3(6)^2$

12) $\sum_{m=3}^{8} m(m-1) =$ 166

$= 3(3-1)+4(4-1)+5(5-1)+\ldots+8(8-1)$

Rewrite each series using sigma notation.

13) $5 + 10 + 15 + 20 + 25 + 30$

$\sum_{k=1}^{6} 5k$

14) $25 + 36 + 49 + 64 + 81$

$\sum_{n=5}^{9} n^2$

15) $4 + 16 + 64 + 256 + 1024 + 4096$

$\sum_{x=1}^{6} 4^x$

16) $4 + 5 + 6 + 7 + 8 + 9$

$\sum_{a=4}^{9} a$

Evaluate.

17) $\frac{20!}{17!} =$ 6840

18) $\frac{(n+1)!}{n!} = n+1$

Evaluate each limit.

19) $\lim_{n\to\infty}(n^4 - 2n^2 + 3) =$ ∞

$f(10) = 9803$

$f(100) = 99980003$

20) $\lim_{n\to\infty}(-n^3 + n^2 + 5n - 2) =$ $-\infty$

$f(10) = -852$

$f(100) = -989502$

21) $\lim_{n\to-\infty}\frac{-n-2}{n^2+2n+2} =$ 0

$\frac{\frac{-n-2}{n^2}}{\frac{n^2+2n+2}{n^2}} = \frac{\frac{-n}{n^2}-\frac{2}{n^2}}{\frac{n^2}{n^2}+\frac{2n}{n^2}+\frac{2}{n^2}} = \frac{\frac{-1}{n}-\frac{2}{n^2}}{1+\frac{2}{n}+\frac{2}{n^2}} \to \frac{0-0}{1+0+0} = 0$

22) $\lim_{n\to\infty}\frac{3n}{n+2} =$ 3

$\frac{\frac{3n}{n}}{\frac{n+2}{n}} = \frac{3}{\frac{n}{n}+\frac{2}{n}} = \frac{3}{1+\frac{2}{n}} \to \frac{3}{1+0} = \frac{3}{1} = 3$

23) $\lim_{n\to-\infty}\frac{3n^2}{n^2-9} =$ 3

$\frac{\frac{3n^2}{n^2}}{\frac{n^2-9}{n^2}} = \frac{3}{\frac{n^2}{n^2}-\frac{9}{n^2}} = \frac{3}{1-\frac{9}{n^2}} \to \frac{3}{1-0} = \frac{3}{1} = 3$

24) $\lim_{n\to\infty}\cos\frac{1}{n} =$ 1

$f(10) = .9999847$

$f(100) = .9999999848$