

Do as much w/out calculator!

**ARITHMETIC SEQUENCES AND SERIES HW**

NAME: \_\_\_\_\_

1. Write the first five terms of the sequence defined by the given explicit formula  $a_n = 3n - 6$

$-3, 0, 3, 6, 9$

2. Write the first five terms of each sequence defined by the given recursive formula  $a_1 = 4$  and  $a_n = a_{n-1} + 5$

$4, 9, 14, 19, 24$

3. Write the terms of the series, then **evaluate**

$$\sum_{n=1}^5 3n-2 \quad (3(1)-2) + (3(2)-2) + (3(3)-2) + (3(4)-2) + (3(5)-2) = \boxed{35}$$

$1 + 4 + 7 + 10 + 13$

Tell whether the sequence is arithmetic, geometric, or neither and give explicit formula if the sequence is ARITHMETIC.

4.  $1, 4, 9, 16, 25 \dots x^2$   
 $\begin{matrix} \sqrt{1} & \sqrt{4} & \sqrt{9} & \sqrt{16} & \sqrt{25} \\ +3 & +5 & & & \end{matrix}$

neither - quadratic

5.  $1, 8, 15, 22, 29 \dots a_1 = 1, d = 7$   
 $\begin{matrix} \sqrt{1} & \sqrt{8} & \sqrt{15} & \sqrt{22} & \sqrt{29} \\ +7 & +7 & +7 & +7 & \end{matrix}$   
 $1 + 7(n-1)$

arithmetic  $\rightarrow a_n = 7n - 6$

6.  $\frac{9}{4} \cdot \frac{3}{2} \cdot \frac{3}{4} \cdot 0 \cdot \frac{3}{4} \dots$   
 $1 + 7n - 7$

arithmetic  $\rightarrow$

7.  $\sqrt{3}, \sqrt{5}, \sqrt{7}, \sqrt{9}, \dots$   
 $7n - 6$

neither

8. Find  $a_6$  in the arithmetic sequence where  $a_4 = 7$  and  $a_7 = 22$

$\boxed{17}$

$\begin{matrix} n & | & a_n \\ \hline 4 & | & 7 \\ 7 & | & 22 \end{matrix}$   
 $3 < \quad \quad \quad > 15$

$\frac{15}{3} = 5 \quad a_6 = 22 - 5 = 17$

9. Write the series using sigma notation  $-2 + -7 + -12 + -17 + -22$

$\sum_{n=1}^5 (-2 - 5(n-1))$   
 or  
 $\sum_{n=1}^5 (-5n + 3)$

$\begin{matrix} \sqrt{-2} & \sqrt{-7} & \sqrt{-12} & \sqrt{-17} & \sqrt{-22} \\ -5 & -5 & -5 & -5 & \end{matrix}$   
 $-2 - 5(n-1)$   
 $-2 - 5n + 5$   
 $-5n + 3$   
 $a_1 = -2, d = -5$

10. Find the sum of the arithmetic series  $-2 + -7 + -12 + -17 + -22$

$-60$

**Application problems.**

11. A theater has 50 rows of seats. The front row has 25 seats, and after that, each row has 6 more seats than the previous row. How many seats are there in the theater?

$a_1 = 25$   
 $d = 6$   
 $\sum_{n=1}^{50} (25 + 6(n-1)) \rightarrow \boxed{9600}$

12. A couch potato plans to jog for 10 minutes the first day, and increases 5 minutes every day. At which day will they be able to jog for one hour?

10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60

$60 = 10 + 5(n-1)$

$50 = 5n - 5$

$55 = 5n \rightarrow n = 11$

day 11

13. Find the 20<sup>th</sup> term in an arithmetic sequence whose 5<sup>th</sup> term is 48 and 11<sup>th</sup> term is 36.

	56	$a_{20}$
1	54	
2	52	
3	50	
4		
$n$	$a_n$	$\downarrow +2 \uparrow$
5	48	
11	36	$\downarrow -2$

$a_1 = 56$

$a_{20} = 56 - 2(20-1)$

$a_{20} = 18$

$\frac{-12}{6} = -2 = d$

15  
 $\sum_{n=1}$