Accelerated Geometry CC | Name: KEY
Sequences and Series Review | Date: ________ Period: ____

#1-2: Write the first five terms of each sequence:

1. $a_n = -3n+8$

$a_1=-3(1)+8$, $a_2=-3(2)+8$, $a_3=-3(3)+8$, $a_4=-3(4)+8$, $a_5=-3(5)+8$ → 5, 2, −1, −4, −7

2. $a_n = 2n^2 - 3$

$a_1=2(1)^2-3$, $a_2=2(2)^2-3$, $a_3=2(3)^2-3$, $a_4=2(4)^2-3$, $a_5=2(5)^2-3$ → −1, 5, 15, 29, 47

#3-4: Write the terms of each series and then evaluate the sum:

3. $\sum_{j=1}^{4}(-3j+1)$ → arithmetic

$n=4$
$a_1=-3(1)+1$
$a_4=-3(4)+1$

$S_4=\frac{4}{2}(-2-11)$

$\boxed{S_4=-26}$

4. $\sum_{k=1}^{3}(2k^2+3k+2)$ → Not arithmetic or geometric

$a_1=2(1)^2+3(1)+2$
$a_2=2(2)^2+3(2)+2$
$a_3=2(3)^2+3(3)+2$

$7+16+29$

$\boxed{S_3=52}$

5. Evaluate: $\sum_{j=1}^{5}(j-3)^2$ → Not arithmetic or geometric

$a_1=(1-3)^2$, $a_2=(2-3)^2$, $a_3=(3-3)^2$, $a_4=(4-3)^2$, $a_5=(5-3)^2$

$4+1+0+1+4$

$\boxed{S_5=10}$

#6-7: Based on the terms given, state whether or not each sequence is arithmetic. If it is, identify the common difference, d.

6. $\frac{2}{5},\frac{5}{6},\frac{6}{7},\frac{7}{8},\frac{8}{9},\ldots$

$d=\frac{5}{6}-\frac{2}{5}=\frac{13}{30}$ → No!

7. 8, 5.7, 3.4, 1.1, …

$d=5.7-8=-2.3$ → Yes!

8. For the given arithmetic sequence, find a_{19} and write the explicit formula for the nth term of the sequence: 4, 7, 10, 13, …

$a_n=a_1+d(n-1)$

$d=7-4=3$

$a_{19}=4+3(19-1)=\boxed{58}$

$a_n=a_1+d(n-1)$
$a_n=4+3(n-1)$
$a_n=4+3n-3$
$\boxed{a_n=3n+1}$

9. For the given arithmetic sequence, find a_{10}: $1,\frac{6}{5},\frac{7}{5},\frac{8}{5},\ldots$

$a_n=a_1+d(n-1)$

$d=6/5-1=1/5$

$a_{10}=1+1/5(10-1)=\boxed{14/5}$

10. Write an explicit formula for the nth term of the arithmetic sequence: 14, 9, 4, -1, -6, …

$a_n=a_1+d(n-1)$

$d=9-14=-5$

$a_n=a_1+d(n-1)$
$a_n=14-5(n-1)$
$a_n=14-5n+5$
$\boxed{a_n=-5n+19}$

11. Find the 10^{th} term of the arithmetic sequence where $a_1=2.1$ and $a_4=1.83$

$d=\frac{1.83-2.1}{3}=-.09$

$a_{10}=a_1+d(10-1)$
$a_{10}=2.1-.09(9)=\boxed{1.29}$

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12. Find the 13^{th} term of the arithmetic sequence where $a_3 = 10$ and $a_7 = 26$ → $d = \frac{26-10}{4} = 4$

$a_{13} = a_1 + d(13-1)$ $\quad$ $10 = a_1 + 4(3-1)$

$a_{13} = 2 + 4(12) = \boxed{50}$ $\quad$ $10 = a_1 + 8$

$2 = a_1$

#13-14: For each arithmetic series, find S_{22}:

13. $6 + 2 + (-2) + (-6) + \ldots$ $d = 2 - 6 = -4$

$a_{22} = 6 - 4(22-1)$

$a_{22} = -78$ $\quad$ $S_{22} = \frac{22}{2}(6-78) = \boxed{-792}$

14. $3 + 3\frac{3}{4} + 4\frac{1}{2} + 5\frac{1}{4} + \ldots$ $d = 3\,3/4 - 3 = 3/4$

$a_{22} = 3 + 3/4(22-1)$

$a_{22} = 75/4$

$S_{22} = \frac{22}{2}(3 + 75/4)$

$\boxed{S_{22} = 239.25}$

15. Evaluate: $\sum_{k=1}^{4}(1.2 - 4.1k)$ → arithmetic

$n = 4$

$a_1 = -2.9$ $\quad$ $S_4 = \frac{4}{2}(-2.9 - 15.2) = \boxed{-36.2}$

$a_4 = -15.2$

#16-17: Determine whether each sequence is a geometric sequence. If so, identify the common ratio, r.

16. $10, 2, \frac{2}{5}, \frac{2}{25}, \ldots$

$r = \frac{2}{10} = \frac{1}{5}$ → Yes!

17. 9, 0.9, 0.09, 0.009, …

$r = \frac{0.9}{9} = 0.1$ → Yes!

$a_n = a_1 r^{n-1}$

18. Write an explicit form for the nth term of the geometric sequence: $40, 10, 2\frac{1}{2}, \frac{5}{8}, \ldots$

$r = \frac{10}{40} = 1/4$

$a_n = 40(1/4)^{n-1}$

$a_n = a_1 r^{n-1}$

19. For the given geometric sequence, find a_9: 54, 36, 24, 16, …

$r = \frac{36}{54} = \frac{2}{3}$

$a_9 = 54(2/3)^{9-1}$

$\boxed{a_9 = 2.107}$

20. Given the geometric series 400 + 300 + 225 + 168.75 + …, find S_{16} to the nearest tenth.

$S_n = a_1\left(\frac{1-r^n}{1-r}\right)$ $\quad$ $r = \frac{300}{400} = 3/4$ $\quad$ $S_{16} = 400\left(\frac{1 - 3/4^{16}}{1 - 3/4}\right) = \boxed{1584}$

21. Given the geometric series 6 – 14.4 + 34.56 – 82.944 + …, find S_8 to the nearest tenth.

$S_n = a_1\left(\frac{1-r^n}{1-r}\right)$ $\quad$ $r = \frac{-14.4}{6} = -2.4$ $\quad$ $S_8 = 6\left(\frac{1-(-2.4)^8}{1-(-2.4)}\right) = \boxed{-1940.7}$

22. Evaluate: $\sum_{k=1}^{5} \underset{a_1}{1.5}\left[(\underset{r}{-2})^{k-1}\right]$ geometric

$S_5 = 1.5\left(\frac{1-(-2)^5}{1-(-2)}\right) = \boxed{16.5}$

23. Evaluate: $\sum_{k=1}^{10} \underset{r}{3.5}^{k-1}$ geometric $\quad a_1 = 1$

$S_{10} = 1\left(\frac{1-3.5^{10}}{1-3.5}\right) = \boxed{110341.5}$