

Unit 4 Extra Review WS

	Equation		Series
Arithmetic	$a_n = a_1 + (n-1)d$	Common difference: 1) If you have any two consecutive terms use $d = a_n - a_{n-1}$ 2) If you don't have consecutive terms use $d = \frac{a_m - a_n}{m - n}$, where $m > n$	$S_n = \frac{n}{2}(a_1 + a_n)$
Geometric	$a_n = a_1 r^{n-1}$	Common ratio: 1) If you have any two consecutive terms, use $r = \frac{a_{n+1}}{a_n}$ 2) If you don't have consecutive terms use one of the following: a) $r = \left(\frac{a_m}{a_n}\right)^{\frac{1}{m-n}}$ b) $a_n = a_1 r^{n-1}$ - use system of equations by using this equation twice	Finite: $S_n = a_1 \frac{(1-r^n)}{1-r}$ Infinite: $S_\infty = \frac{a_1}{1-r}$, for $ r < 1$

Find d.

1. 14, 9, 4, -1, ...
2. $a_3 = 20$ and $a_{15} = 72$

$$10. \sum_{n=0}^{14} -2n + 4$$

$$11. \sum_{n=5}^{19} -4n + 5$$

Find the nth term of the arithmetic sequence.

3. 30, 27, 24, 21, ...
4. $d = \frac{1}{3}$ and $a_1 = 6$
5. $a_1 = -12$ and $a_2 = -8$
6. $a_3 = 6$ and $a_{27} = 54$
7. $d = -6$ and $a_{12} = 50$

12. Find the partial sum for $14 + 22 + 30 + \dots + 70$.

13. **Find n** if $S_n = 348$ and the series is
 $7 + 11 + 15 + 19 + \dots + a_n$

14. **Find a_{125}** for the sequence: -3, 6, 15, 24, ...

Find r.

15. 3, 9/2, 27/4, 81/8, ...
16. $a_6 = 128$ and $a_9 = 54$

Arithmetic summation

8. $4 + 7 + 10 + 13 + 16 + \dots$; $n = 20$

$$9. \sum_{n=1}^{14} 3n - 1$$

Find the nth term of the geometric sequence.

17. 4, -12, 36, -108...

18. $r = -\frac{1}{3}$ and $a_1 = 6$

19. $a_1 = -12$ and $a_2 = -8$

20. $a_4 = 24$ and $a_8 = 121.5$

21. $r = 5$ and $a_4 = 2$

22. **Find a_{10}** of the sequence $\frac{2}{81}, \frac{2}{27}, \frac{2}{9}, \dots$

Geometric summation

23. $6 - 12 + 24 - 48 + \dots$; $n = 10$

24. $\sum_{n=1}^6 -3(2)^n$

25. $\sum_{n=0}^7 4(-2)^n$

26. $\sum_{n=1}^9 4\left(\frac{3}{2}\right)^{n-1}$

27. $\sum_{n=1}^{\infty} 4\left(\frac{1}{3}\right)^{n-1}$

28. $\sum_{n=0}^{\infty} -\left(\frac{1}{2}\right)^n$

29. $\sum_{n=1}^{\infty} 6\left(\frac{3}{2}\right)^n$

30. $12 + 2.4 + .48 + .096 + \dots$

31. $24 + \frac{48}{5} + \frac{96}{25} + \dots$

32. **Find the partial sum** for
 $2 + 6 + 18 + \dots + 4374$

33. **Find n** if $S_n = 1275$ and the series is
 $5 + 10 + 20 + 40 + \dots + n$

34. **Re-write the repeating decimals into fractions.** $0.\overline{15}$

35. **Re-write the repeating decimals into fractions.** $0.\overline{51}$

36. **Evaluate:** $\frac{9!}{4!(9-4)!}$

37. **Simplify:** $\frac{(n+3)!}{(n+5)!}$

Find the sum.

38. $\sum_{k=1}^8 3(2)^{k-1}$

39. $\sum_{k=1}^4 k^2 - 5$

40. $\sum_{n=1}^8 3n + 1$

41. $\sum_{k=0}^{\infty} 2\left(-\frac{2}{3}\right)^k$

42. $\sum_{i=1}^{\infty} -4(3)^{i-1}$

Find the next term AND identify the type of sequence as arithmetic, geometric or neither.

43. $4, \frac{5}{2}, 1, -\frac{1}{2}, \dots$

44. $8, 12, 18, 27, \dots$

45. $2, 5, 10, 17, 26, \dots$

Identify the type of sequence as arithmetic, geometric or neither.

46. $\sum_{n=1}^6 \left(-\frac{1}{2}n + 1\right)$

47. $\sum_{n=1}^6 \left(-\frac{1}{2}\right)^n$

Chapter 4 Review WS (Answers)

1. $d = -5$
2. $d = 13/3$
3. $a_n = -3n + 33$
4. $a_n = \frac{1}{3}n + \frac{17}{3}$
5. $a_n = 4n - 16$
6. $a_n = 2n$
7. $a_n = -6n + 122$
8. 650
9. 301
10. -150
11. -645
12. 336
13. $n = 12$
14. $a_{125} = 1113$
15. $\frac{3}{2}$
16. $\frac{3}{4}$
17. $a_n = 4(-3)^{n-1}$
18. $a_n = 6\left(-\frac{1}{3}\right)^{n-1}$
19. $a_n = -12\left(\frac{2}{3}\right)^{n-1}$
20. $a_n = \frac{64}{9}\left(\frac{3}{2}\right)^{n-1}$
21. $a_n = \frac{2}{125}(5)^{n-1}$
22. 486
23. -2046
24. -378
25. -340
26. ≈ 299.55
27. 6
28. -2
29. no sum; $r > 1$
30. 15
31. 40
32. 6560
33. 8
34. $\frac{5}{33}$
35. $\frac{17}{33}$
36. 126
37. $\frac{1}{(n+5)(n+4)}$
38. 765
39. 10
40. 116
41. $\frac{6}{5}$
42. no solution
43. -2, arithmetic
44. 40.5, geometric
45. 37, neither
46. arithmetic
47. geometric