Pre-Calculus **11.2 Homework** **Name_____**
[Day 2] **Sequences & Series Worksheet** **[2015]**

Write the first five terms of the sequence. Determine whether or not the sequence is arithmetic. If it is, find the common difference.

1. $a_n = 8 + 13n$

2. $a_n = \frac{1}{n+1}$

3. $a_n = 2^n + n$

Find the nth term of the sequence, then find the 20th term.

4. $a_1 = 2$ and $d = 3$

5. $-6, -4, -2, \ldots$

6. $a_1 = 0$ and $d = \frac{2}{3}$

7. $\frac{2}{5}, \frac{1}{15}, \frac{-4}{15}, \ldots$

Find the nth term of the sequence.

8. $a_1 = -4$ and $a_5 = 16$

9. $a_3 = 94$ and $a_6 = 85$

10. $a_5 = 190$ and $a_{10} = 115$

Find the nth term of the sequence.

11. $a_6 = -38$ and $a_{11} = -73$

12. $a_3 = 19$ and $a_{15} = -1.7$

13. $a_5 = 16$ and $a_{14} = 38.5$

Find the indicated nth partial sum (S_n) of the arithmetic sequence.

14. $8,\ 20,\ 32,\ 44, \ldots\ n = 10$

15. $a_1 = -6, d = 4, n = 50$

16. $100 + 105 + 110 + \cdots + 220$

17. $0.5 + 1.3 + 2.1 + \ldots + 70.1$

18. $a_1 = 3, d = 2, n = 12$

19. $a_1 = 100, d = -5, n = 8$

20. $a_2 = 8, a_5 = 9.5, n = 12$

21. $-3 + \left(\frac{-3}{2}\right) + 0 + \cdots + 30$

Find the sums of the following arithmetic series in summation notation.

22. $\sum_{n=1}^{50} n$

23. $\sum_{n=51}^{100} 2n$

24. $\sum_{n=75}^{500} (n+6)$

25. $\sum_{n=100}^{250} (600-n)$

26. $\sum_{n=11}^{30} n - \sum_{n=1}^{10} n$

27. $\sum_{n=2}^{17} 2n - \sum_{n=5}^{10} n$

28. How many terms of the arithmetic sequence $-2,\ 3,\ 8,\ldots$ must be added to get 1573?

29. How many terms of the arithmetic sequence $15,\ 12,\ 9,\ldots$must be added to get -39?

30. How many terms of the arithmetic sequence $-1,\ 2,\ 5,\ldots$ must be added to get 609?

Answers

1. $21, 34, 47, 60, 73$; Arithmetic; $d = 13$

2. $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \frac{1}{6}$; Not Arithmetic

3. $3, 6, 11, 20, 37$; Not Arithmetic

4. $a_n = 3n - 1; a_{20} = 59$

5. $a_n = 2n - 8\ ;\ a_{20} = 32$

6. $a_n = \frac{2}{3}n - \frac{2}{3};\ a_{20} = \frac{38}{3}$

7. $a_n = -\frac{1}{3}n + \frac{11}{15};\ a_{20} = -\frac{89}{15}$

8. $a_n = 5n - 9$

9. $a_n = -3n + 103$

10. $a_n = -15n + 265$

11. $a_n = -7n + 4$

12. $a_n = -1.725n + 24.175$

13. $a_n = 2.5n + 3.5$

14. $S_{10} = 620$

15. $S_{50} = 4{,}600$

16. $S_{25} = 4{,}000$

17. $S_{88} = 3{,}106.4$

18. $S_{12} = 168$

19. $S_8 = 660$

20. $S_{12} = 123$

21. $S_{23} = \frac{621}{2}$

22. $S_{50} = 1{,}275$

23. $S_{50} = 7{,}550$

24. $S_{426} = 125{,}031$

25. $S_{151} = 64{,}175$

26. $S = 355$

27. $S = 259$

28. $n = 26$

29. $n = 13$

30. $n = 21$

Pre-Calculus **11.3 Homework** **Name_____**
[Day 2] **Sequences & Series Worksheet** **[2015]**

The nth term of a sequence is given. Find the first five terms of the sequence.

1. $a_n = 3(-4)^{n-1}$

2. $a_n = 3^{n-1}$

Find the nth term or the geometric sequence with giver first term *a* and a common ratio *r*. What is the fourth term?

3. $a = -6,\ r = 3$

4. $a = \sqrt{3},\ r = \sqrt{3}$

Determine if the sequence is geometric. If it is geometric, find the common ratio.

5. $2,\ 6,\ 18,\ 36 \ldots$

6. $27,\ -9,\ 3,\ -1 \ldots$

7. $\frac{1}{2},\ \frac{1}{4},\ \frac{1}{6},\ \frac{1}{8} \ldots$

Find the first five terms of the sequence and determine if it is geometric. If it is geometric, find the common ratio and express the nth term of the sequence in the standard form $\boldsymbol{a_n = ar^{n-1}}$

8. $a_n = 4 + 3^n$

9. $a_n = (-1)^n 2^n$

10. $a_n = n^n$

Determine the common ratio, the fifth term, and the nth term of the geometric sequence.

11. $7, \frac{14}{3}, \frac{28}{9}, \frac{56}{27} \ldots$

12. $1, \sqrt{2}, 2, 2\sqrt{2} \ldots$

13. $-8, -2, -\frac{1}{2}, -\frac{1}{8} \ldots$

14. The first term of a geometric sequence is 3, and the third term is $\frac{4}{3}$. Find the fifth term.

15. The common ratio in a geometric sequence is $\frac{3}{2}$, and the fifth term is 1. Find the first three terms.

For the following problems, find the sum of the infinite geometric series, if possible.

16. $1-\frac{1}{2}+\frac{1}{4}-\frac{1}{8}+\cdots$

17. $\frac{2}{5}+\frac{4}{25}+\frac{8}{125}+\cdots$

18. $3-\frac{3}{2}+\frac{3}{4}-\frac{3}{8}+\cdots$

Express the repeating decimal as a fraction.

19. $0.2\overline{53}$

20. $0.123123123123\ldots$

Answers

1. $3,\ -12,\ 48,\ -192,\ 768$

2. $1,\ 3,\ 9,\ 27,\ 81$

3. $a_n = -6(3)^{n-1},\ a_4 = -162$

4. $a_n = \sqrt{3}\left(\sqrt{3}\right)^{n-1},\ a_4 = 9$

5. Not geometric

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

7. Not geometric

8. $7,\ 13,\ 31,\ 85,\ 247;$ Not geometric

9. $-2,\ 4,\ -8,\ 16,\ -32;\ r = -2;\ a_n = -2(-2)^{n-1}$

10. $1,\ 4,\ 27,\ 256,\ 3125;$ Not geometric

11. $r = \frac{2}{3};\ a_5 = \frac{112}{81}\ ;\ a_n = 7\left(\frac{2}{3}\right)^{n-1}$

12. $r = \sqrt{2};\ a_5 = 4\ ;\ a_n = 1\left(\sqrt{2}\right)^{n-1}$

13. $r = \frac{1}{4};\ a_5 = -\frac{1}{32}\ ;\ a_n = -8\left(\frac{1}{4}\right)^{n-1}$

14. $a_5 = \frac{16}{27}$

15. $\frac{16}{81}, \frac{8}{27}, \frac{4}{9}$

16. $\frac{2}{3}$

17. $\frac{2}{3}$

18. 2

19. $\frac{251}{990}$

20. $\frac{123}{999}$