Name Mr. Ward Date _____ Class _____

LESSON 12-3

Practice B

Arithmetic Sequences and Series

Determine whether each sequence could be arithmetic. If so, find the common difference and the next term.

1. 41, 24, 7, –10, –27, ...

   −17 −17 −17 −17

   $d = -17$, -44

2. 6, –6, 6, –6, 6, –6, 6, –6, ...

   −12 +12 −12

   Not Arithmetic

3. $\frac{4}{5}, \frac{13}{10}, \frac{9}{5}, \frac{23}{10}, \frac{14}{5}, \ldots$

   0.5 0.5 0.5

   $d = 1/2$, 3.3

4. 2, 4, 8, 16, 32, 64, ...

   +2 +4 +8 +16

   Not Arithmetic

Find the 12th term of each arithmetic sequence.

5. 21, 32, 43, 54, 65, ...

   $a_{12} = 21 + (12-1)\,11 = 142$

6. 3.7, 3.3, 2.9, 2.5, 2.1, ...

   $a_{12} = 3.7 + (12-1)\,-0.4 = -0.7$

7. 1.8, –1.1, –4, –6.9, –9.8, ...

   $a_{12} = 1.8 + (12-1)\,-2.9 = -30.1$

8. –8, –2.75, 2.5, 7.75, 13, ...

   $a_{12} = -8 + (12-1)\,5.25 = 49.75$

Find the missing terms in each arithmetic sequence.

9. 3, 17, 31, 45, 59, ...

   $59 = 3 + (5-1)d$ $d = 14$

10. –4, 5, 14, 23, ...

    $23 = -4 + (4-1)d$ $d = 9$

11. 7, 18, 29, 40, 51, 62, ...

    $62 = 7 + (6-1)d$ $d = 11$

12. 35, 29, 23, 17, 11, 5, −1, –7, ...

    $-7 = 35 + (8-1)d$ $d = -6$

Find the 10th term of each arithmetic sequence.

13. $a_4 = 12$ and $a_7 = 20.4$

    See Attached

14. $a_3 = 37$ and $a_{17} = -12$

    See Attached

15. $a_{13} = -5$ and $a_{18} = -51$

    See Attached

16. $a_{25} = 18$ and $a_{41} = 62$

    See Attached

Solve.

17. A banquet hall uses tables that seat 4, one person on each side. For a large party, the tables are positioned end to end in a long row. Two tables will seat 6, three tables will seat 8, and four tables will seat 10. How many tables should be set end to end to seat 40?

    $40 = 4 + (n-1)2$ 19 tables

    $36 = (n-1)2$

    $18 = n-1$

Practice B Worksheet

13. $a_7 = a_4 + (7-4)d$

$20.4 = 12 + 3d$

$d = 2.8$

$a_{10} = a_7 + (10-7)2.8$

$a_{10} = 20.4 + 8.4$

$a_{10} = 28.8$

14. $a_{17} = a_3 + (17-3)d$

$-12 = 37 + 14d$

$-49 = 14d$

$d = -3.5$

$a_{10} = a_3 + (10-3)-3.5$

$a_{10} = 37 + -24.5$

$a_{10} = 12.5$

15. $a_{18} = a_{13} + (18-13)d$

$-51 = -5 + 5d$

$d = -9.2$

$a_{10} = a_{13} + (10-13)-9.2$

$a_{10} = -5 + 27.6$

$a_{10} = 22.6$

16. $a_{41} = a_{25} + (41-25)d$

$62 = 18 + 16d$

$d = 2.75$

$a_{10} = a_{25} + (10-25)2.75$

$a_{10} = 18 - 41.25$

$a_{10} = -23.25$

Name Mr. Ward Date _____ Class _____

LESSON 12-4

Practice B

Geometric Sequences and Series

Determine whether each sequence could be geometric or arithmetic. If possible, find the common ratio or difference.

1. 1.1, –3.3, 9.9, –29.7, 89.1, ...

Geometric $r = -3$

2. –18, –7, 4, 15, 26, ...

Arithmetic $d = 11$

3. 1, 2, 6, 24, 120, 720, ...

Neither

4. 3125, 2500, 2000, 1600, 1280, ...

Geometric $r = 0.8$

Find the 10th term of each geometric sequence.

5. 1600, 800, 400, 200, ...

$a_{10} = 1600 \cdot (1/2)^{10-1}$ $a_{10} = 3.125$

6. 0.0000001, 0.00001, 0.001, 0.1, ...

$a_{10} = 0.0000001 \cdot (100)^{10-1}$ $a_{10} = 1 \times 10^{11}$ or 100,000,000,000

7. –64, 96, –144, 216, ...

$a_{10} = -64 \cdot (1.5)^{10-1}$ $a_{10} = 2460.375$

8. 2, –6, 18, –54, ...

$a_{10} = 2 \cdot (-3)^{10-1}$ $a_{10} = -39,366$

Find the 8th term of each geometric sequence with the given terms.

9. $a_3 = 12$ and $a_6 = 96$

$a_6 = a_3 \cdot r^{6-3}$ $96 = 12 \cdot r^3$ $r = 2$

$a_8 = a_6 \cdot (2)^{8-6}$ $= 96 \cdot 4$ $a_8 = 384$

10. $a_{15} = 100$ and $a_{17} = 25$

$a_{17} = a_{15} \cdot r^{17-15}$ $25 = 100 \cdot r^2$ $r = \pm 1/2$

$a_8 = a_{15} \cdot (1/2)^{8-15}$ $a_8 = 100 \cdot 128$ $a_8 = \pm 12,800$

11. $a_{11} = -4$ and $a_{13} = -36$

See Attached

12. $a_3 = -4$ and $a_5 = -36$

See Attached

Find the indicated sum for each geometric series.

13. S_{25} for $-1 + 2 - 4 + 8 - 16 + 32 - 64 + \ldots$

See Attached

14. S_9 for $2500 + 1500 + 900 + 540 + \ldots$

See Attached

15. $\sum_{k=1}^{10} \left(\frac{1}{2}\right)^{k-5}$ $S_{10} = 16 \cdot \left(\frac{1-(1/2)^{10}}{1-1/2}\right)$ $a_1 = 16$ $S_{10} = 31.97$

16. $\sum_{k=1}^{6} 9\left(\frac{3}{4}\right)^{k-3}$ $S_6 = 16 \cdot \left(\frac{1-(3/4)^6}{1-3/4}\right)$ $a_1 = 16$ $S_6 = 52.61$

17. $\sum_{k=1}^{7} 5(0.1)^{k-4}$ $S_7 = 5000 \cdot \left(\frac{1-(0.1)^7}{1-0.1}\right)$ $a_1 = 5,000$ $S_7 = 5,555.6$

16. S_7 for 14, 42, 126, 378, ...

17. $\sum_{k=1}^{8} (-4)^{k-1}$

Solve.

18. Deanna received an e-mail asking her to forward it to 10 other people. Assume that no one breaks the chain and that there are no duplicate recipients. How many e-mails will have been sent after 8 generations, including Deanna's?

Practice B Worksheet

11. $a_{13} = a_{11} \cdot r^{13-11}$

$-36 = -4 \cdot r^2$

$r = \pm 3$

$a_8 = a_{11} \cdot (3)^{8-11}$

$a_8 = -4 \cdot 1/27$

$a_8 = \pm 4/27$

12. $a_5 = a_3 \cdot r^{5-3}$

$-36 = -4 \cdot r^2$

$r = \pm 3$

$a_8 = a_5 \cdot (3)^{8-5}$

$a_8 = -36 \cdot 27$

$a_8 = \pm 972$

13. $S_{25} = -1 \cdot \left(\frac{1-(-2)^{25}}{1-(-2)} \right)$

$S_{25} = -11,184,811$

14. $S_9 = 2500 \cdot \left(\frac{1-(0.6)^9}{1-(0.6)} \right)$

$S_9 = 6187.01$