Series Practice Name: KEY

**Use the formulas for arithmetic and geometric series to answer the following:

Arithmetic Series $s_n = \frac{n}{2}(a_1 + a_n)$

Evaluate the related series of each sequence.

1) 13, 15, 17, 19, 21, 23

108

2) 6, 11, 16, 21, 26, 31, 36

147

3) 22, 28, 34, 40, 46

170

4) 39, 49, 59, 69

216

11) $a_1 = 42$, $a_n = 146$, $n = 14$

1316

12) $a_1 = 4$, $a_n = 22$, $n = 10$

130

13) $a_1 = 2$, $a_n = 122$, $n = 13$

806

14) $a_1 = -18$, $a_n = -102$, $n = 13$

-780

15) $20 + 27 + 34 + 41 \ldots$, $n = 16$

1160

16) $20 + 30 + 40 + 50 \ldots$, $n = 15$

1350

17) $7 + 9 + 11 + 13 \ldots$, $n = 10$

160

18) $10 + 12 + 14 + 16 \ldots$, $n = 11$

220

Geometric Series $s_n = \frac{a_1(1-r^n)}{1-r}$

Evaluate the related series of each sequence.

1) 2, 12, 72, 432

518

2) −1, 5, −25, 125

104

3) −2, 6, −18, 54, −162

-122

4) −2, −12, −72, −432, −2592

-3110

13) $1 + 2 + 4 + 8 \ldots$, $n = 6$

63

14) $2 - 10 + 50 - 250 \ldots$, $n = 8$

-130208

15) $1 - 4 + 16 - 64 \ldots$, $n = 9$

52429

16) $-2 - 6 - 18 - 54 \ldots$, $n = 9$

-19682

17) $1 - 5 + 25 - 125 \ldots$, $n = 7$

13021

18) $-3 - 6 - 12 - 24 \ldots$, $n = 9$

-1533

Determine if each geometric series converges or diverges.

1) $a_1 = -3,\ r = 4$

D

2) $a_1 = 4,\ r = -\frac{3}{4}$

C

3) $a_1 = 5.5,\ r = 0.5$

C

4) $a_1 = -1,\ r = 3$

D

5) $81 + 27 + 9 + 3....$

C

6) $7.1 + 17.75 + 44.375 + 110.9375....$

D

7) $-3 + \frac{12}{5} - \frac{48}{25} + \frac{192}{125}....$

C

8) $\frac{128}{3125} - \frac{64}{625} + \frac{32}{125} - \frac{16}{25}....$

D

Infinite Geometric Series $s = \frac{a_1}{1-r}$ where $|r| < 1$

*determine if it converges before using the formula. If it does not, write none.

Evaluate each infinite geometric series described.

13) $a_1 = 3,\ r = -\frac{1}{5}$

2.5

14) $a_1 = 1,\ r = -4$

div

15) $a_1 = 1,\ r = -3$

div

16) $a_1 = 1,\ r = \frac{1}{2}$

2

17) $1 + 0.5 + 0.25 + 0.125....$

2

18) $3 - \frac{9}{4} + \frac{27}{16} - \frac{81}{64}....$

12/7

19) $81 - 27 + 9 - 3....$

243/4

20) $1 - 0.6 + 0.36 - 0.216....$

5/8