

Name: _____

Show work needed to justify your answer.

Date: _____

HW: # 19: Math IBSL - Standard 19 - Arithmetic and Geometric Series

5 points

- 1 For each series below, decide whether it is arithmetic or geometric, then find the sum.

a $\frac{1}{5} + \frac{8}{15} + \frac{13}{15} + \dots S_7$

$\frac{3}{15} + \frac{8}{15} + \frac{13}{15} + \dots S_7$

Arithmetic

$$S_7 = \frac{7}{2} \left(2\left(\frac{3}{15}\right) + (7-1)\left(\frac{1}{3}\right) \right) =$$

$$S_7 = \frac{7}{2} \left(\frac{2}{5} + \frac{2}{1} \right)$$

$$S_7 = \frac{7}{2} \left(\frac{12}{5} \right) = \boxed{\frac{42}{5}}$$

c $0.1 + 0.05 + 0.025 + \dots S_8$

$\times 0.5$ $\times 0.5$ $r = 0.5$

geometric

$$S_8 = \frac{0.1(1 - 0.5^8)}{1 - 0.5}$$

$$S_8 = 0.199$$

d $6 + 12 + 18 + \dots + 288$

$+6$
Arithmetic

$$288 = 6(n-1) + 6$$

$$282 = 6(n-1)$$

$$47 = n-1$$

$$n = 48$$

$$S_{48} = \frac{48}{2} (2(6) + (48-1)6)$$

$$S_{48} = 24(12 + 47(6))$$

$$S_{48} = 7056$$

f $\sum_{n=1}^6 (-1)^{n-1} (2)^n$ geometric

$$u_1 = 2 \quad u_2 = -4 \quad r = -2$$

$$S_6 = \frac{2(1 - (-2)^6)}{1 - (-2)} = \frac{2(1 - 64)}{3}$$

$$S_6 = \frac{2(-63)}{3}$$

$$S_6 = -42$$

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- 2 A theatre has 30 rows of seats. There are 22 seats in the first row, 26 in the second row, 30 in the third row, etc. How many people will the theatre hold?

Arithmetic

$$u_1 = 22$$

$$d = 4$$

$$S_{30} = \frac{30}{2} (2(22) + 29(4))$$

$$S_{30} = 15(44 + 116)$$

$$S_{30} = 15(160)$$

$$S_{30} = 2400$$

- 5 Consider the following sequence of figures made up of line segments.

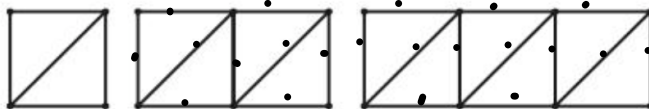


Figure 1

Figure 2

Figure 3

Find the total number of line segments in the first 48 figures.

$$S_{48} = \frac{48}{2} [2(5) + (48-1)4]$$

$$S_{48} = 24 [10 + 47(4)]$$

$$S_{48} = 24(198)$$

$$S_{48} = 4752$$

$$u_1 = 5 \text{ Arithmetic}$$

$$u_2 = 9$$

$$u_3 = 13$$

$$d = 4$$