Make sure you use the appropriate formulas for finite and infinite geometric series. Show your work!

+8 1. Find $\sum_{k=2}^{11}(-2)^k$.

$a = 4$
$r = -2$
$n = 10$

$$\frac{4(1-(-2)^{10})}{1-(-2)} = -1364$$

+8 2. Find $3 - 9 + 27 - 81 + \cdots + 3^9$.

$a = 3$
$r = -3$
$n = 9$

$$\frac{3(1-(-3)^{9})}{1-(-3)} = 14,763$$

+6 3. Find (as a fraction) $\sum_{k=3}^{\infty}\left(\frac{3}{4}\right)^j$.

$a = \left(\frac{3}{4}\right)^3 = \frac{27}{64}$

$r = \frac{3}{4}$

$$\frac{\frac{27}{64}}{1-\left(\frac{3}{4}\right)} = \frac{27}{64}\cdot\frac{4}{1} = \frac{27}{16}$$

+6 4. Find (as a fraction) $-\frac{1}{3} + \frac{2}{9} - \frac{4}{27} + \cdots$.

$a = -\frac{1}{3}$
$r = -\frac{2}{3}$

$$\frac{-\frac{1}{3}}{1-\left(-\frac{2}{3}\right)} = -\frac{1}{3}\cdot\frac{3}{5} = -\frac{1}{5}$$

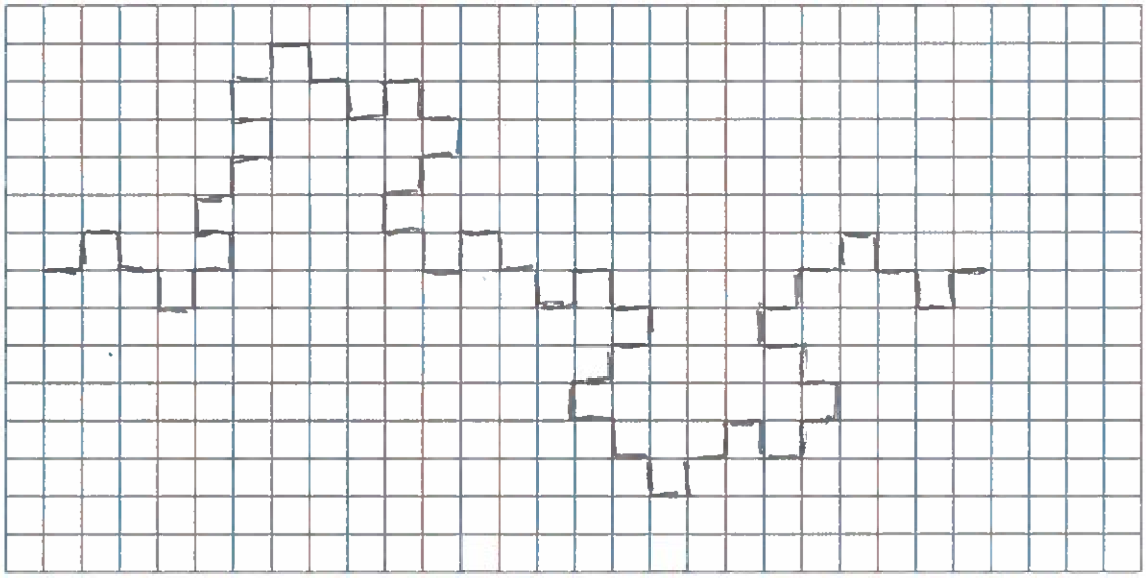
+6 5. Below are pictures of an initial segment and the first iteration of a recursive scheme. If the total width of each iteration is 2, what is the total length of the fourth iteration? Round to two decimal places.

Replacing with 9 segments which are $\frac{1}{5}$ as long: $r = \frac{9}{5}$

$$2\left(\frac{9}{5}\right)^4 \approx 21.00$$

+8

6. Sketch the second iteration of the recursive scheme described in the previous problem.



7. Suppose your screen is 800 pixels wide and 600 pixels deep (800×600). Find the two functions (one for x, and one for y) which convert from user space to screen space. Assume user space is a square with lower left-hand corner $(0, 0)$ and upper right-hand corner $(2, 2)$.

+5

x: Points are $(0,0)$ and $(2,800)$.

Slope: $\frac{800-0}{2-0} = 400$

$x_{screen} = 400\, x_{user}$

+5

y: Points are $(0,600)$ and $(2,0)$

Slope $= \frac{0-600}{2-0} = -300$

$y_{screen} = -300\, y_{user} + 600$