

Math 143 Set 4

1. Simplify these geometric series (or write “divergent!” if the sum does not exist):

a. $\sum_{n=0}^{\infty} (0.7)^n.$

b. $\sum_{n=2}^{\infty} \frac{3^n}{5^{n-1}}.$

c. $\sum_{n=1}^{\infty} \frac{5^n + 6^n}{7^n}.$

d. $\sum_{n=0}^{\infty} \frac{5^n 6^n}{7^n}.$

e. $9.99999 \dots = 9 + 0.9 + 0.09 + 0.009 + \dots.$

f. $\sum_{n=1}^{\infty} (-1)^n \left(\frac{1}{2}\right)^{n+1}$

g. $\sum_{n=1}^{\infty} \frac{2^{n+2}}{4^n}$

h. $\sum_{n=0}^{\infty} (-1)^n$

2. For which values of x do these sums make sense (for which values of x do they converge)? Use the formula for the geometric series $\frac{1}{1-x} = \sum_{n=0}^{\infty} x^n$, which is true only for values of x such that $-1 < x < 1$, to find exactly what these functions are equal to when they do converge.

a. $\sum_{n=0}^{\infty} (x+1)^n.$

b. $\sum_{n=0}^{\infty} (2x)^n.$

c. $\sum_{n=1}^{\infty} 2x^n.$

d. $\sum_{n=2}^{\infty} (3x-2)^n.$

3. What percentage of the area in the square on the next page is green? (There are an infinite number of triangles.)

