

MA 2733

Worksheet 1 – September 6, 2015

Name \_\_\_\_\_

1. Unrolling recursions

(a) Give an explicit formula for the sequence recursively defined by  $a_n = \sqrt{3} \cdot a_{n-1}$  for  $n \geq 1$ , with initial condition  $a_0 = 9$ .

(b) Give an explicit formula for the sequence recursively defined by  $a_n = \frac{3}{2} \cdot a_{n-1}$  for  $n \geq 3$ , with initial condition  $a_2 = 2$ .

(c) Give an explicit formula for the sequence recursively defined by  $a_n = 2n \cdot a_{n-1}$  for  $n \geq 1$ , with the initial condition  $a_0 = 1$ .

2. Reindex the series  $\sum_{n=1}^{\infty} \frac{(n-1)^2}{(n+1)^2}$  to a series of the form  $\sum_{n=0}^{\infty} b_n$ .

3. (a) Using sigma notation, write a series summing the even terms of  $\sum_{n=1}^{\infty} \frac{1}{n}$ . I.e., find

$$\text{a series } \sum_{n=1}^{\infty} a_n = \frac{1}{2} + \frac{1}{4} + \frac{1}{6} + \dots$$

(b) Using sigma notation, write a series summing the odd terms of  $\sum_{n=1}^{\infty} \frac{1}{n}$ . I.e., find a

$$\text{series } \sum_{n=1}^{\infty} b_n = 1 + \frac{1}{3} + \frac{1}{5} + \dots$$