Math 110 – Chapter 8 – Worksheet 2 – Version A

Geometric Sequences and Series; The Binomial Theorem

8.3 Geometric Sequences and Series

1. Find the common ratio of the for the geometric sequence 6, 18, 54, 162, 486, …
2. Determine whether the sequence $a_n = \left(\frac{3}{2}\right)^n$ is geometric. If so, find the first term and the common ratio.
3. For the geometric sequence $2, \frac{6}{5}, \frac{18}{25}, \frac{54}{125}, \ldots$ Find
   (a) a_1 (b) r (c) a_n
4. Find the 18th term of the geometric sequence whose first term is 7 and common ratio is $\frac{3}{2}$.
5. Find the number of terms of the geometric sequence $\frac{1}{9}, \frac{1}{3}, 1, 3, 9, \ldots 729$.
6. Find the sum (of the geometric series) $\sum_{k=1}^{17} 3(0.4)^k$
7. An Individual Retirement Account (IRA) is a common way to save money to provide funds after retirement. Suppose you make payments of $1500 into an IRA at the end of each year at an annual interest rate of 4.5% per year, compounded annually. What is the value of the annuity after 30 years?
8. Find the infinite sum $3 + 2 + \frac{4}{3} + \frac{8}{9} + \cdots$

8.5 The Binomial Theorem

9. Expand $(3y - x)^6$
10. Evaluate each expression: (a) $\binom{6}{2}$ (b) $\binom{12}{9}$
11. Find the binomial expansion of $(5x - 2y)^5$
12. Find the coefficient of x^3y^9 in the expansion of $(2x - y)^{12}$
13. Find the term containing x^3 in the expansion of $(2x + y)^{15}$
14. Find the fourth term in the expansion of in the expansion of $(4x - 3y)^{12}$. Assume decreasing powers of x.