1. Do the following problems from the xeroxed handout: §1.1 (p. 5) #13abcdefm; §1.2 (p. 8) #1; §1.3 (p. 15) #3,5,6; §2.1 (p. 23) #3,4.

2. Write each of the following in summation notation:

(a) $1 + \dfrac{1}{4} + \dfrac{1}{9} + \dfrac{1}{16} + \dfrac{1}{25} + \cdots$ (b) $\dfrac{1}{4} + \dfrac{3}{8} + \dfrac{7}{16} + \dfrac{15}{32} + \dfrac{31}{64} + \cdots$.   (c) $1 + \dfrac{1}{2} + \dfrac{1}{6} + \dfrac{1}{24} + \dfrac{1}{120} + \cdots$.

3. What is s_5, the fifth partial sum, of the series $\displaystyle\sum_{n=1}^{\infty} \dfrac{1}{3^n}$?

4. For each of the following, find the sum or determine that it diverges.

(a) $1 + \dfrac{1}{3} + \dfrac{1}{9} + \dfrac{1}{27} + \cdots$.   (b) $1 - \dfrac{1}{3} + \dfrac{1}{9} - \dfrac{1}{27} + \cdots$.   (c) $1.01 + (1.01)^2 + (1.01)^3 + \cdots$.

5. Use a geometric series to find the rational number represented by the given decimal.

(a) $0.\overline{8}$ (b) $0.\overline{36}$

6. Suppose that 75 cents of every dollar spent in the U.S. is spent again in the U.S. If the federal government pumps an extra billion into the economy, how much spending occurs as a result?

7. (a) Calculate a and b if $\dfrac{3 - 4i}{1 + 2i} = a + bi$.

(b) Check your answers by calculating $(1 + 2i)(a + bi)$.

8. Let $z = -5 + 12i$. Find the the norm (or length) of each of the following: z, z^2, $\dfrac{1}{z}$, $z + \bar{z}$.

9. Suppose we know that the *harmonic series* $\displaystyle\sum_{k=1}^{\infty} \dfrac{1}{k}$ diverges and that the series $\displaystyle\sum_{k=1}^{\infty} \dfrac{1}{k^2}$ converges. Determine which of the following series converge. Justify your answers, and compute the sum, when possible.

(a) $\displaystyle\sum_{k=1}^{\infty} \dfrac{\ln k}{k}$ (b) $\displaystyle\sum_{k=1}^{\infty} \dfrac{1}{2^{3k}}$ (c) $\displaystyle\sum_{k=1}^{\infty} \dfrac{3^{k+1}}{2^{2k-2}}$

(d) $\displaystyle\sum_{k=1}^{\infty} \dfrac{1}{7^k + k}$ (e) $\displaystyle\sum_{k=1}^{\infty} 21^{-k}(7^k - 3^k)$ (f) $\displaystyle\sum_{k=1}^{\infty} i^k$

(g) $\dfrac{2 - 2i}{3} + \dfrac{1}{3} + \dfrac{1 + i}{6} + \dfrac{i}{6} + \cdots$