MATH 3790 - Homework Set 3

Not to be handed in

November 10, 2003

1. Prove that for non-negative values of a, b, c we get

$$\frac{a^2}{bc} + \frac{b^2}{ac} + \frac{c^2}{ab} \geq 3$$

2. Given that $a + b + c + d + e = 8$ and $a^2 + b^2 + c^2 + d^2 + e^2 = 16$, find the maximum value of e.

3. Find all values of x and y such that

$$\frac{x}{y} + \frac{y}{x} \geq 2$$

4. Given the following system of equations:

$$\begin{aligned} a + b + c &= 3 \\ a^2 + b^2 + c^2 &= 5 \\ a^3 + b^3 + c^3 &= 7 \end{aligned}$$

What is the value of $a^4 + b^4 + c^4$?

5. A number x is 8 digits long and contains each of the digits 1 through 8 exactly once. If such a number is chosen at random, what is the probability that it is divisible by 36?