MA 330 ASSIGNMENT # 5

In your own words, explain the statements and proofs of the following results of Euler. Imagine that you are explaining it to one of your peers in this class who has not yet seen it. What is Euler trying to prove? What is the general approach of his argument? Are there any surprises or significant details to be aware of in the proof? Answers to problems may be handwritten.

(1) Euler's computation of the sum $\sum_{k=1}^{\infty} \frac{1}{k^2}$.
(2) Euler's solution to the Seven Bridges of Koenigsberg Problem.

(3) Show that any number of the form $4k + 3$ (where k is a whole number) is not a sum of two squares. (Hint: suppose that $4k + 3 = a^2 + b^2$, and consider what happens when a is odd or even, and when b is odd or even.)