微積分 A 預習測驗 #1

姓名：＿＿＿＿＿＿＿＿ 系級：＿＿＿＿ 學號：＿＿＿＿＿＿＿ 分數：

Read Chapter 0 – A Preview of Calculus (pages 2-9) and answer the following questions.

1. Calculus is concerned with [____] and [____] ; it deals with [____]

   that approach other [____] .

2. The origins of calculus, go back at least 2500 years to the ancient [____] , who found areas

   using the method of [____] .

3. Use the above method to find the area A of the region under the graph of $y = x^2$ on the interval $[0, 1]$
   (see Figure 3 of page 3).

   (a) Let A_n be the area of the union of the n shaded rectangles appeared in the last picture of page 3,
   then $A_n = $ [____] .

   (b) The desired area $A = \lim_{n \to \infty} A_n = $ [____] .

4. The area problem is the central problem in the branch of calculus called [____] .
   The technique that we will develop in Chapter 5 for finding areas will also enable us to compute the
   [____] of a solid, the [____] of a curve, the [____] of water against
   a dam, the [____] and [____] of a rod, and the [____]
   in pumping water out of a tank.

5. The tangent problem has given rise to the branch of calculus called [____] , which
   was not invented until more than 2000 years after integral calculus. The main ideas behind differential
   calculus are due to the [____] mathematician Pierre Fermat (1601-1665), and were developed
   by the [____] mathematicians John Wallis (1616-1703), Isaac Barrow (1630-1677), and Isaac
   Newton (1642-1627) and the German mathematician Gottfried Leibniz (1646-1716).

6. The two branches of calculus and their chief problems, The [____] problem and the [____]
   problem, appear to be very [____] , but it turns out that there is a very close [____]
   between them. The tangent problem and the area problem are [____] problems in a sense
   that will be described in Chapter 5.