

**Quiz****Name**

1. A culture of bacteria is being studied in a lab in a situation of exponential growth. At time  $t = 0$ , there are 5,000 bacteria in the culture. At time  $t = 2$  hours, the number has increased to 8,000. Find the growth constant  $\mu$  of the culture and a formula that provides an approximation of the number of bacteria at any time  $t \geq 0$ .

2. Another culture of bacteria is being studied under laboratory conditions, again during its exponential growth phase. At time  $t = 0$ , there are 7000 bacteria in the culture. At time  $t = 1$  hour, the number of bacteria is seen to increase at a rate of 10,500 bacteria per hour. Find the growth constant  $\mu$  of the culture and a formula that approximates the number of bacteria at any time  $t \geq 0$ . [You will discover that the solution  $x$  of the equality  $\frac{3}{2x} = e^x$  is relevant. Sketch graphs that demonstrate that the solution  $x$  is unique. Why is it the case that  $0 < x < 1$ ? Experiment with a calculator to approximate  $x$ .]