DIAGNOSTIC 1

MODELING AND SIMULATION

1. In the space below, write a sequence of MATLAB statements that evaluates the following expression. Your should assume that the values of μ (mu), σ (sigma) and x are already set. You should use at least one variable to store the value of a subexpression.

$$\frac{e^{-\left(\frac{x-\mu}{\sigma\sqrt{2}}\right)^2}}{\sigma\sqrt{2\pi}} \tag{1}$$
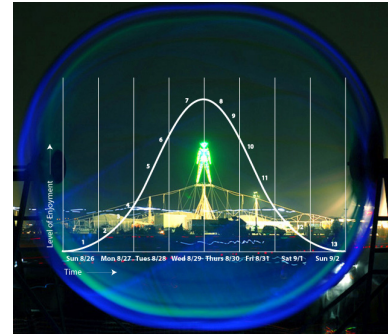

Figure 1: Burning man bell curve from www.selfreferentialtitle.com/images/2007/09/.

More on the back!

2. Donald, James and Emily are triplets. Their parents set up a savings account for each of them in 2002, the year of their birth. They initially deposited 1000 euros into each account. Emily's account returns 12% every year, compounded annually (she was born first). Donald's account returns 8% every year (he was born second) while James' account returns 5.5% every year. Every year, 5% of Emily's balance is invested in James' account, but Donald only receives 100 euros from Emily every year. Donald also gives 2% of his balance to James. Finally, their parents deposit 1000 euros annually in Emily's account. Assume that all compounding and investing happens simultaneously.

Figure 2: Little bitty babies from www.capturedbycarrie.com/blog/wp-content/uploads/2008/01.

  (a) Draw a compartment diagram for this investment system.

  (b) Write down a set of difference equations and clearly define your notation.