**Course:** CS5961/6951 *Computational Statistics* Sp 2011
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**Due:** Fri, 18 Jan 2010

**Assignment:** *Normal Distribution*

A. Suppose a certain demographic group ***G*** with age 51-61 years has *mean net worth* of $\mu$= \$60,000, with standard deviation $\sigma$ = \$20,000. Assuming a normal distribution pertains, compute the *percentage* (%) of ***G*** that would be expected to have *net worth* (***NW)*** such that :

i. \$60,000 ≤ ***NW*** ≤ \$100,000

ii. \$40,000 ≤ ***NW*** ≤ \$120,000

i. \$20,000 ≤ ***NW*** ≤ \$140,000

When solving this problem, transform the data into the standard normal **z** statistic. For each range i), ii) and iii) above, recast the problem in terms of **z** relative to the parameters of the standard normal distribution. That is, what ranges of **z** correspond to above queries i), ii) and iii), respectively? Let the normal probability density function be $f(t) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{(t-\mu)^2}{2\sigma^2}}$ , and $F(x) = \int_{-\infty}^{x} f(t)dt$ be the cumulative normal distribution function.

i. ? ≤ **z** ≤ ?

ii. ? ≤ **z** ≤ ?

iii. ? ≤ **z** ≤ ?

In writing up the answer, use some standard tool (*Excel, R*, etc) to evaluate the normal probability density function $f(t) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{(t-\mu)^2}{2\sigma^2}}$ , and $F(x) = \int_{-\infty}^{x} f(t)dt$ , the cumulative normal distribution function. Show details.