BIOMETRY, CLASS EXERCISE 9

(1) Rejean is the drinking water inspector for the city of Lavaland. Historical records show that the arsenic concentration in the drinking water coming from a specific lake is 0.12 ppm with standard deviation 0.05 ppm and the distribution is normal. On a recent day the measurement of the arsenic concentration in drinking water taken from this lake exceeds the safety level of 0.25 ppm. What is the probability that the arsenic concentration will exceed 0.25 ppm on a random day? Is this event statistically significant?

(2) The hairy woodpeckers, endemic to North America, have normaly distributed weights (as adults) with mean $\mu = 25g$ and standard deviation of $\sigma = 2g$. What proportion of hairy woodpeckers:
   a) Have weights exceeding $35g$?
   b) Have weights below $21g$?
   c) Have weights in the range $21 - 28g$?
   What weight corresponds to:
   d) The bottom 10% of the distribution?
   e) The top 10% of the distribution?

(3) The merlin is a species of small falcons present in Quebec only during the summers. The wingspans of merlins are normally distributed with mean $\mu = 62cm$ and standard deviation of $\sigma = 5cm$. Compute the values for the 20th, 40th, 60th and 80th percentile in the distribution of merlin wingspans.