Math 321, Handout IV: The Normal Distribution

Do these problems by using Table I in your textbook. Table I also appears in the inside front cover of your textbook. All variables refer to the standard normal distribution unless noted otherwise. I will *not* collect your solutions.

1. What proportion of the z-values satisfy $z \leq 2.155$? In other words, what is the value of the following integral?
$$\int_{-\infty}^{2.155} \frac{1}{\sqrt{2\pi}} e^{-z^2/2}\, dz$$

2. What proportion of the z-values satisfy $z \geq 2.155$? In other words, what is the value of the following integral?
$$\int_{2.155}^{\infty} \frac{1}{\sqrt{2\pi}} e^{-z^2/2}\, dz$$

3. What proportion of the z-values satisfy $0.175 \leq z \leq 2.155$? In other words, what is the value of the following integral?
$$\int_{0.175}^{2.155} \frac{1}{\sqrt{2\pi}} e^{-z^2/2}\, dz$$

4. Find the 87th percentile of the standard normal distribution.

5. For the standard normal distribution, what value of c (on the z-axis) determines an upper tail area of 0.15? In other words, what is the value of c for which the following holds?
$$\int_{c}^{\infty} \frac{1}{\sqrt{2\pi}} e^{-z^2/2}\, dz = 0.15$$

6. What interval, symmetrically placed about zero, captures 60% of the area under the z-curve? In other words, what is the positive number z^* such that the following holds?
$$\int_{-z^*}^{z^*} \frac{1}{\sqrt{2\pi}} e^{-z^2/2}\, dz = 0.60$$

7. Suppose x has a normal distribution with parameters $\mu = 65$ and $\sigma = 2$.
   (a) What proportion of the x-values are less than 67?
   (b) What proportion of the x-values are greater than 67?
   (c) What proportion of the x-values are less than 65?
   (d) What proportion of the x-values are between 65 and 67?