Practice Problems for Z-Scores, Normal Distribution

(Problems from Rosner, Fundamentals of Biostatistics 8th Edition)

Cardiovascular Disease

Because serum cholesterol is related to age and sex, some investigators prefer to express it in terms of *z*-scores, where $Z = \frac{X-\mu}{\sigma}$. Suppose *Z* is regarded as a standard normal random variable.

***5.1** What is $Pr(Z < 0.5)$?

***5.2** What is $Pr(Z > 0.5)$?

***5.3** What is $Pr(-1.0 < Z < 1.5)$?

Suppose a person is regarded as having high cholesterol if $Z > 2.0$ and borderline cholesterol if $1.5 < Z < 2.0$.

***5.4** What proportion of people have high cholesterol?

***5.5** What proportion of people have borderline cholesterol?

Serum cholesterol is an important risk factor for coronary disease. We can show that serum cholesterol is approximately normally distributed, with mean = 219 mg/dL and standard deviation = 50 mg/dL.

*__5.14__ If the clinically desirable range for cholesterol is < 200 mg/dL, what proportion of people have clinically desirable levels of cholesterol?

*__5.15__ Some investigators believe that only cholesterol levels over 250 mg/dL indicate a high-enough risk for heart disease to warrant treatment. What proportion of the population does this group represent?

*__5.16__ What proportion of the general population has borderline high-cholesterol levels—that is, > 200 but < 250 mg/dL?

Problem 2:

Suppose the average number of hours a typical college student sleeps is 6 hours with a standard deviation of 1 hour. (This may or may not be true – I made this problem up). How many hours of sleep do the bottom 30% of students get?