Math 346 Quiz #4 Name: KEY

Show all work. Your answers must be fully justified.

Suppose that a pathologist determines that the amount of Albumin in the blood of a healthy adult is normally distributed with a mean of 4.6 g/dcL and a standard deviation of 0.8 g/dcL.

1. Find the probability of a healthy adult having between 3.5 g/dcL and 5.5 g/dcL of Albumin in his or her blood.

$$\begin{aligned} P(3.5 < x < 5.5) &= P\left(\frac{3.5-4.6}{0.8} < z < \frac{5.5-4.6}{0.8}\right) \\ &= P(-1.375 < z < 1.125) \\ &= \frac{0.4162+0.4147}{2} + \frac{.3686+.3708}{2} \\ &= 0.7852 \\ &= 78.52\% \end{aligned}$$

2. What is the amount of Albumin in the blood that seperates the 10% of people with the highest concentration from the remaining 90% of people with lower levels?

$$\begin{aligned} z &= 1.28 \\ x &= \mu + z\sigma \\ &= 4.6 + (1.28)(0.8) \\ &= 5.624 \text{ g/dcL} \end{aligned}$$

3. (Extra Credit) If 20 people are given blood tests, find the probability that the average amount of Albumin in this group of people is more than 5.0 g/dcL.

$$\begin{aligned} P(\bar{x} > 5.0) &= P\left(z > \frac{5.0-4.6}{\left(\frac{0.8}{\sqrt{20}}\right)}\right) \\ &= P(z > 2.24) \\ &= 0.0125 \\ &= 1.25\% \end{aligned}$$