

Please show all work to receive full credit.

1. The lengths of field goals in the National Football League have a normal distribution with mean 32.2 yards and standard deviation 6.4 yards.

- (a) Draw the density curve for the lengths of the field goals, labeling the mean and one standard deviation above and below the mean.
- (b) Use the 68-95-99.7 rule to find the interval that contains the middle 95% of the lengths of the field goals.

The interval that contains the middle 95% of the lengths of field goals is given by $(32.2 - 2 * 6.4, 32.2 + 2 * 6.4) = (19.4, 45.0)$.

- (c) Find the percent of the field goals that are less than 35 yards.

$$z = \frac{35 - 32.2}{6.4} = 0.4375$$

$$P(Z \leq 0.44) = 0.6700$$

Therefore, 67% of the field goals are less than 35 yards.

- (d) Find the upper decile of the distribution of the lengths of the field goals

$$z = 1.28$$

$$32.2 + 1.28 * 6.4 = 40.392$$

The upper decile of the distribution of the lengths of the field goals is 40.392 yards.

2. The weights of adult male rhesus monkeys have a normal distribution with mean 15 pounds and standard deviation 3 pounds.

- (a) What is the mean of the sampling distribution of the average weight of four randomly selected monkeys?

$$\mu_{\bar{x}} = 15 \text{ pounds}$$

- (b) What is the standard deviation of the sampling distribution of the average weight of four randomly selected monkeys?

$$\sigma_{\bar{x}} = \frac{3}{\sqrt{4}} = 1.5 \text{ pounds}$$