

For every problem, sketch the Normal curve and shade appropriately.

1. In a study investigating the effect of car speed on accident severity, the vehicle speed at impact was recorded for 500 fatal accidents. For these accidents, the mean speed was 42 mph and the standard deviation was 15 mph. A histogram revealed that the vehicle speed distribution was approximately Normal.
 - a. What percentage of vehicle speeds were between 28 and 55 mph?
 - b. What percentage of vehicle speeds were faster than 50 mph?
 - c. What was the speed of the bottom 5% of accidents?

2. The mean number of text messages sent per month by customers of a cell phone service provider is 1,650 and the standard deviation is 750. A histogram showed that the distribution was approximately Normal.
 - a. What percent of customers sent more than 2000 test messages in one month?
 - b. How many test messages would a customer have to send to be in the 85th percentile?
 - c. I only send about 80 test messages a month, what is my percentile?

3. An article stated that for full term babies their mean weight is 7.7 pounds and the standard deviation is 1.32 pounds. Birth weight is normally distributed.
 - a. What is the probability that the birth weight of a randomly selected full term baby is more than 8 lbs?
 - b. What is the probability that the birth weight of a randomly selected full term baby is between 6 and 8 pounds?
 - c. What is the probability that the birth weight of a randomly selected full term baby is less than 4.5 pounds?
 - d. How would you characterize the most extreme 0.1% of all full term baby birth weights?

4. A pizza company advertizes that it puts 0.5 pound of real mozzarella cheese on its medium sized pizzas. In fact, the amount to cheese on a randomly selected medium pizza is normally distributed with a mean of 0.5 pound and a standard deviation of 0.025 pound.
 - a. What is the probability that the amount of cheese on a medium pizza is between 0.533 and 0.545 pound?
 - b. What is the probability that the amount of cheese on a medium pizza exceeds the mean value by more than 2 standard deviations?

5. A tire manufacturer believes that the tread life of its tires can be described by a Normal model with a mean of 32,000 miles and standard deviation of 2500 miles.
 - a. If you buy a set of tires, would it be reasonable for you to hope they'll last 40,000 miles? Explain
 - b. Approximately what fraction of these tires can be expected to last less than 30,000 miles?
 - c. Estimate the quartiles of the tread lives.
 - d. In planning a marketing strategy, a local tire dealer wants to offer a refund to any customer whose tires fail to last a certain number of miles. However, the dealer does not want to take too big a risk. If the dealer is willing to give refunds to no more than 1 out of every 25 customers, for what mileage can he guarantee these tires to last?