

**Using the range rule of thumb to identify unusual values:**

$$\text{maximum usual value} = \mu + 2\sigma$$

$$\text{minimum usual value} = \mu - 2\sigma$$

**Using probabilities to identify unusual values:**

**Unusually high number of successes:**  $x$  successes among  $n$  trials is an unusually high number of successes if  $P(x \text{ or more}) \leq 0.05$ .\*

**Unusually low number of successes:**  $x$  successes among  $n$  trials is an unusually low number of successes if  $P(x \text{ or fewer}) \leq 0.05$ .\*

\*The value of 0.05 is commonly used but is not absolutely rigid. Other values, such as 0.01, could be used to distinguish between events that can easily occur by chance and events that are very unlikely to occur by chance.

**Chapter Quick Quiz**

1. Is a probability distribution defined if the only possible values of a random variable are 0, 1, 2, 3, and  $P(0) = P(1) = P(2) = P(3) = 0.25$ ?
2. There are 100 questions from an SAT test, and they are all multiple choice with possible answers of a, b, c, d, e. For each question, only one answer is correct. Find the mean number of correct answers for those who make random guesses for all 100 questions.
3. Using the same SAT questions described in Exercise 2, find the standard deviation for the numbers of correct answers for those who make random guesses for all 100 questions.
4. If boys and girls are equally likely, groups of 400 births have a mean of 200 girls and a standard deviation of 10 girls. Is 232 girls in 400 births an unusually high number of girls?
5. If boys and girls are equally likely, groups of 400 births have a mean of 200 girls and a standard deviation of 10 girls. Is 185 girls in 400 births an unusually low number of girls?

$x$	$P(x)$
0	0+
1	0.006
2	0.048
3	0.198
4	0.409
5	0.338

*In Exercises 6–10, use the following: Five U.S. domestic flights are randomly selected, and the table in the margin lists the probabilities for the number that arrive on time (based on data from the Department of Transportation). Assume that five flights are randomly selected.*

6. Does the table describe a probability distribution?
7. What does the probability of 0+ indicate? Does it indicate that among five randomly selected flights, it is impossible that none of them arrives on time?
8. What is the probability that at least three of the five flights arrive on time?
9. Is 0 an unusually low number of flights arriving on time?
10. Is 5 an unusually high number of flights arriving on time?

**Review Exercises**

*In Exercises 1–4, assume that 40% of the population has brown eyes (based on data from Dr. P. Sorita at Indiana University).*

1. **Brown Eyes** If six people are randomly selected, find the probability that none of them has brown eyes.
2. **Brown Eyes** Find the probability that among six randomly selected people, exactly four of them have brown eyes.