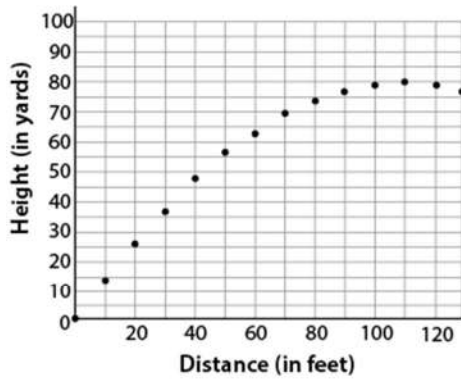


## Problem Solving, Statistics, Probability, Proportions, Percents Practice

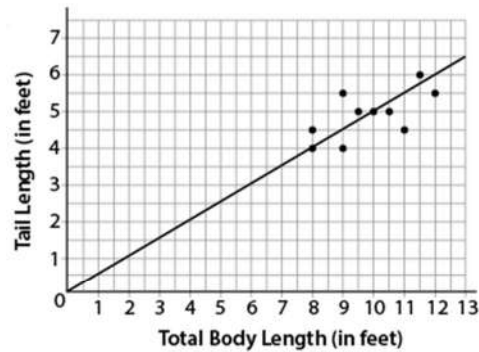
1.



The figure above shows part of the path of a planned roller coaster hill. What is the sum, in feet, of the vertical height and the horizontal distance that the roller coaster will travel while on this particular hill?

- (A) 220
- (B) 300
- (C) 460
- (D) 900

2.



The Florida Department of Wildlife caught and tagged 10 adult female alligators as part of an effort to protect this endangered species. They took various measurements and readings related to body size and health. The total body length is plotted against the tail length in the scatterplot shown above, along with a line of best fit. Which of the following equations best models the data?

- (A)  $y = 0.5x$
- (B)  $y = 2x$
- (C)  $y = 0.4x + 1$
- (D)  $y = 0.6x - 1$

### 3. Calculator

The American political system is largely a twoparty system. In fact, only six candidates who were not associated with either the Republican or the Democratic Party have been elected governor in any state since 1990. In one such election, the ratio of votes received for the Independent candidate to the Democratic candidate to the Republican candidate was approximately 19:18:13. If 510,000 votes were cast in the election, how many more votes were cast for the Independent candidate than for the Republican candidate?

- (A) 6,000
- (B) 10,200
- (C) 51,200
- (D) 193,800

## 4. Calculator

| Selection Method          | Number of States |
|---------------------------|------------------|
| Election                  | 22               |
| Gubernatorial Appointment | 11               |
| Legislative Appointment   | 2                |
| Missouri Plan             | 15               |

There are four ways in which state judges are selected for their positions. One is by election, another is appointment by the governor (usually with the confirmation by the state legislature), and a third is appointment by the state legislature. The final way is a hybrid of the last two, called the Missouri Plan, in which a nonpartisan legislative committee recommends a list of candidates and the governor chooses from this list. The table above shows the number of states that engage in each process for the highest court of the state, usually called the state Supreme Court. What percent of states select judges using the Missouri Plan?

- (A) 17%
- (B) 30%
- (C) 33%
- (D) 43%

## 5. Calculator

A dendrologist (a botanist who studies trees exclusively) is examining the way in which a certain tree sheds its leaves. He tracks the number of leaves shed each day over the period of a month, starting when the first leaf is shed. He organizes the data in a scatterplot and sees that the data can be modeled using an exponential function. He determines the exponential model to be  $f(x) = 6(1.92)^x$ , where  $x$  is the number of days after the tree began to shed its leaves. What does the value 1.92 in the function tell the dendrologist?

- (A) The number of leaves shed almost doubles each day.
- (B) The number of leaves shed almost doubles every six days.
- (C) The number of leaves left on the tree is reduced by about 92% each day.
- (D) The number of leaves left on the tree is reduced by about 92% every six days.

## 6 and 7. Calculator

Plants are capable of cross-pollinating with related but different plants. This creates a hybrid. Sometimes, a hybrid plant is superior to the two different plants from which it was derived. This is "hybrid vigor." Scientists can examine the DNA of a plant to see if it is a hybrid. This can be information because if the plant appears superior, it would be beneficial to develop more of these. An agricultural scientist examines an orchard that has several types of apple trees and orange trees which ones are hybrids. Some of the information she collected is shown in the table below.

|            | Apple Trees | Orange Trees | Total |
|------------|-------------|--------------|-------|
| Hybrid     |             |              | 402   |
| Non-hybrid |             | 118          |       |
| Totals     |             |              | 628   |

6. Based on the data, if 45% of the apple trees are not hybrids, how many apple trees are hybrids?

- (A) 50
- (B) 132
- (C) 226
- (D) 240

7.

The scientist wants to study the orange trees to check for hybrid vigor. If she chooses one orange tree at random, what is the probability that it will be a hybrid?

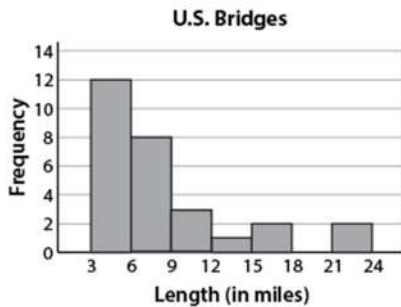
- (A)  $\frac{59}{194}$
- (B)  $\frac{97}{157}$
- (C)  $\frac{135}{314}$
- (D)  $\frac{135}{194}$

## 8. Calculator

Mount Fuji in Japan was first climbed by a monk in 663 ad and subsequently became a Japanese religious site for hundreds of years. It is now a popular tourist site. When ascending the mountain, tourists drive part of the distance and climb the rest of the way. Suppose a tourist drove to an elevation of 2,390 meters and from that point climbed to the top of the mountain, and then descended back to the car taking the same route. If it took her a total of 7 hours to climb up and back down, and she climbed at an average rate of 264 vertical meters per hour going up and twice that going down, approximately how tall is Mount Fuji?

- (A) 1,386 meters
- (B) 2,772 meters
- (C) 3,776 meters
- (D) 5,172 meters

## 9. Calculator



The Lake Pontchartrain Causeway Bridge in Louisiana is the longest bridge in the United States, at 23.83 miles long. The histogram above shows the distribution of the lengths, in miles, of 28 of the longest bridges in the United States, including Lake Pontchartrain Causeway Bridge. Which of the following could be the median length of the 28 bridges represented in the histogram?

- (A) 5.9
- (B) 7.9
- (C) 9.2
- (D) 9.9

## 10. Calculator

In the United States, the original full retirement age was 65. The retirement age has since been pushed to 66 and will soon move to 67, as life expectancies go up. The Social Security Administration periodically conducts studies regarding retirement age. One such study focused on whether or not retiring early lowers a person's life expectancy. The study found a weak positive correlation between retirement age and life expectancy. If data from the study were graphed in a scatterplot, which of the following statements would be true?

- (A) The slope of the line of best fit would be a large positive number.
- (B) The slope of the line of best fit would be a negative number close to 0.
- (C) The data points would follow, but not closely, an increasing line of best fit.
- (D) The data points would be closely gathered around an increasing line of best fit.