Mathematics and Statistics

What You Should Know

In both the general and career track sections of the Job Knowledge test, the questions require knowledge of a general understanding of basic mathematics. This includes both general mathematics as well as statistical procedures. The questions encompass word problems and calculations.

The questions in the following section are for your review. Go through each question and try your best to answer it. The explanation of the answer follows immediately afterward so that you can actually learn new material. After you've completed reviewing these questions and answers, three brief practice review tests at the end of the chapter help you determine how much you know. Of course, there is a full-length exam at the end of Part II that also includes math and statistics questions.

Mathematics and Statistics Review Section

Read the following questions and select the choices that best answer the questions.

1. While on a trip to Greece, Janet decides to purchase a pair of shoes that cost 6,274 Drachmas. If each U. S. dollar is worth 200.5 Drachmas, what is the price of the shoes in U. S. dollars?

A. $12.58
B. $31.29
C. $33.45
D. $125.79

B. $6{,}274 \text{ Drachmas} \times \frac{1 \text{ U.S. dollar}}{200.5 \text{ Drachmas}} = \$31.29.$

2. Dennis ran a race in 2.2 minutes. Kayla ran the same race in 124 seconds. What is the difference between these two times?

A. 2 seconds
B. 8 seconds
C. 14 seconds
D. 22 seconds

B. Convert 2.2 minutes to seconds. $2.2 \times 60 = 132$ seconds. The difference in the two times is $132 - 124 = 8$ seconds.

3. The members of the Larchmont Automobile Club were surveyed about their favorite color of car. Each member could only select one color. The survey results are shown in the following table.

Color	*Frequency*
Red	45
Blue	33
Black	41
White	13
Green	18

What is the relative frequency of the choice "red"?

A. 0.2
B. 0.3
C. 0.45
D. 45

B. Overall, 45 + 33 + 41 + 13 + 18 = 150 people were surveyed. Of these, 45 said red, so the frequency for red is 45, and the relative frequency is 45 ÷ 150 = 0.3.

4. Stanley can type 35 words per minute. If it takes him a half-hour to type a document, about how many words are in the document?

A. 900
B. 1,050
C. 1,500
D. 2,100

B. There are 30 minutes in a half-hour. $30 \times 35 = 1{,}050$ words.

5. A recipe calls for 3 cups of wheat and white flour combined. If $\frac{3}{8}$ of this is wheat flour, how many cups of white flour are needed?

A. $1\frac{1}{8}$
B. $1\frac{7}{8}$
C. $2\frac{3}{8}$
D. $2\frac{5}{8}$

B. $\frac{3}{8}$ is wheat flour, then $1 - \frac{3}{8}$ or $\frac{5}{8}$ is white flour. So $3 \times \frac{5}{8} = \frac{15}{8} = 1\frac{7}{8}$ cups of white flour are needed.

6. A barrel holds 60 gallons of water. If a crack in the barrel causes $\frac{1}{2}$ a gallon to leak out each day, how many gallons of water remain after 2 weeks?

A. 30
B. 53
C. $56\frac{1}{2}$
D. 59

B. In 2 weeks, or 14 days, $\frac{1}{2} \times 14 = 7$ gallons leak out, leaving 60 – 7 = 53 gallons.

7. Which of the following sets of data is bimodal?

$A = \{2, 3, 3, 3, 4, 4, 5, 7\}$
$B = \{2, 2, 3, 3, 4, 4, 5, 6, 7\}$
$C = \{2, 3, 4, 5, 6, 7\}$
$D = \{2, 3, 3, 4, 5, 5, 7\}$

A. *A*
B. *B*
C. *C*
D. *D*

D. A bimodal set is a set that has two modes; in other words, there are two different numbers that appear the most frequently. The set that has this property is *D,* where the numbers 3 and 5 both occur twice.

8. Jack lives $6\frac{1}{2}$ miles from the library. If he walks $\frac{1}{3}$ of the way and takes a break, what is the remaining distance to the library?

A. $5\frac{5}{6}$ miles
B. 4 miles
C. $4\frac{1}{3}$ miles
D. $2\frac{1}{6}$ miles

C. $\frac{1}{3}$ of $6\frac{1}{2}$ miles is $\frac{1}{3} \times 6\frac{1}{2} = \frac{1}{3} \times \frac{13}{2} = \frac{13}{6}$ miles walked. The remaining distance is $6\frac{1}{2} - \frac{13}{6} = \frac{13}{2} - \frac{13}{6} = \frac{39}{6} - \frac{13}{6} = \frac{26}{6} = 4\frac{1}{3}$ miles.

9. A sweater originally priced at $40 is on sale for $30. What percent has the sweater been discounted?

A. 25%
B. 33%
C. 70%
D. 75%

A. The amount of discount is $40 – $30 = $10. The percent of discount is the amount of discount divided by the original price. $\frac{10}{40} = \frac{1}{4} = 25\%$.

10. Kevin can read 2 pages in 3 minutes. At this rate, how long will it take him to read a 360-page book?

A. 30 minutes
B. 2 hours
C. 6 hours
D. 9 hours

D. Using the ratio $\frac{\text{pages}}{\text{minutes}}$, the proportion $\frac{2}{3} = \frac{360}{x}$ can be used to find the time. Cross multiply. $2x = 3 \times 360$, so $2x = 1{,}080$ and $x = \frac{1{,}080}{2} = 540$ minutes. Convert minutes to hours. There are 60 minutes in one hour, so $\frac{540}{60} = 9$ hours.

11. Hazel eats $\frac{3}{8}$ of a pizza and divides the rest between her two friends. What percent of the pizza do her friends each receive?

A. 62.50%
B. 37.50%
C. 31.25%
D. 18.75%

C. If $\frac{3}{8}$ of the pizza is eaten, then $1 - \frac{3}{8} = \frac{5}{8}$ remains. If that is divided by 2, then each receives $\frac{5}{8} \div 2 = \frac{5}{8} \times \frac{1}{2} = \frac{5}{16} = 0.3125 = 31.25\%$.

12. One-fourth of the cars purchased at a dealership are luxury models. If 360 luxury models were sold last year, how many total cars were purchased?

A. 90
B. 250
C. 1,440
D. 3,600

C. If t is the total number of cars sold, and $\frac{1}{4}$ of the total cars sold are luxury, luxury cars sold = 360, so $\frac{1}{4}t = 360$ and $t = 360 \times 4 = 1{,}440$ total cars sold.

Questions 13–15 are based on the following situation.

The following table shows the number of freshmen and sophomores involved in various sports. Each student participates in only one sport.

Sport	***Freshmen***	***Sophomores***
Football	9	13
Soccer	8	19
Basketball	2	5
Baseball	8	6

13. What percent of the students played basketball?

A. 7%
B. 10%
C. 14%
D. 20%

B. The total number of students is 70. Of these, 2 + 5 = 7 play basketball. Finally, 7 ÷ 70 = 10%.

14. Approximately what percent of the freshmen listed played football?

A. 28.7%
B. 31.4%
C. 33.3%
D. 81.4%

C. There are 27 freshmen playing sports, and of these, 9 play football. This is about 33.3%.

15. How many more sophomores played these particular sports than freshmen?

A. 10
B. 12
C. 14
D. 16

D. A total of 43 sophomores played as opposed to 27 freshmen. The difference is 43 – 27 = 16.

Problems 16–18 are based on the following situation.

A survey of video-game-playing habits among twelve junior high school students resulted in the following data in hours per week: 9, 2, 2.5, 7, 6.5, 11, 7, 1.5, 1, 4, 12, 8.5

16. What is the average (arithmetic mean) number of hours spent playing video games by the students in the survey?

A. 5.25 hours
B. 5.75 hours
C. 6.0 hours
D. 6.5 hours

C. To find the arithmetic mean, add up the twelve scores to get 72. Divide by 12 to get 6.

17. What is the range of the data values for the students given above?

A. 10 hours
B. 11 hours
C. 12 hours
D. 13 hours

B. The range is the difference between the largest and smallest values; that is, 12 – 1 = 11.

18. A similar survey among high school students showed that the average number of hours spent a week playing video games per student was 20% less than the same figure for junior high school students. What was the average number of hours per week spent playing video games for high school students?

A. 4.6 hours
B. 4.8 hours
C. 5.2 hours
D. 7.2 hours

B. The average number of hours for junior high school students was 6. To reduce 6 by 20%, determine 80% of 6. Thus, $6 \times 80\% = 4.8$ hours.

19. If 400 people can be seated in 8 subway cars, how many people can be seated in 5 subway cars?

A. 200
B. 250
C. 300
D. 350

B. If 400 people fit in 8 subway cars, then $400 \div 8$, or 50, people fit in one subway car. Therefore, 50×5, or 250, people fit in 5 subway cars.

20. Rachel ran $\frac{1}{2}$ mile in 4 minutes. At this rate, how many miles can she run in 15 minutes?

A. $1\frac{7}{8}$
B. 4
C. 30
D. 60

A. The proportion $\frac{\frac{1}{2}\text{ mile}}{4\text{ minutes}} = \frac{x\text{ miles}}{15\text{ minutes}}$ models this situation. Cross multiply.

$$\frac{1}{2} \times 15 = 4x \text{ so } \frac{15}{2} = 4x \text{ and } x = \frac{15}{2} \cdot \frac{1}{4} = \frac{15}{8} = 1\frac{7}{8} \text{ miles.}$$

21. Mr. Scalici earns a weekly salary of $300 plus 10% commission on all sales. If he sold $8,350 last week, what were his total earnings?

A. $835
B. $865
C. $1,135
D. $1,835

C. The amount of commission is 10% × $8,350 = $835. Total earnings are $300 + $835 commission = $1,135.

22. Which is the only measure of central tendency that can be used for qualitative data?

A. the arithmetic mean
B. the median
C. the mode
D. the range

C. The mode, which is simply the most frequently occurring value, is the only measure of central tendency that can be determined with qualitative, non-numerical data.

23. A 10-foot rope is to be cut into equal segments measuring 8 inches each. The total number of segments is

A. 1
B. 8
C. 15
D. 40

C. The total number of inches in a 10 foot rope is 10 × 12 = 120 inches. The number of 8 inch segments that can be cut is $\frac{120}{8} = 15$.

24. A restaurant bill without tax and tip comes to $38.40. If a 15% tip is included after a 6% tax is added to the amount, how much is the tip?

A. $6.11
B. $5.76
C. $5.15
D. $2.30

A. The tax on the bill is $38.40 × 6% = $2.30. The amount, including tax, is $38.40 + $2.30 = $40.70. The tip is $40.70 × 15% = $6.11.

25. Floor tiling costs $13.50 per square yard. What would it cost to tile a room 15 feet long by 18 feet wide?

A. $20
B. $405
C. $1,350
D. $3,645

B. The area of a room 15 feet wide by 18 feet long is $15 \times 18 = 270$ square feet. Because there are 3 feet in a yard, there are 3×3 or 9 square feet in a square yard. Convert 270 square feet to square yards. $\frac{270}{9} = 30$ square yards. Because the cost is $13.50 per square yard, the total cost is 13.50×30, or $405.

26. Fencing costs $4.75 per foot. Posts cost $12.50 each. How much will it cost to fence a garden if 10 posts and 34 feet of fencing are needed?

A. $472.50
B. $336.50
C. $315.50
D. $286.50

D. The total cost for the posts and fencing is $(10 \times \$12.50) + (34 \times \$4.75) = \$125.00 + \$161.50 = \$286.50$.

27. Brian took an admissions exam. After taking the test, Brian was told that his score was in the 64th percentile. What does this statement mean?

A. 64 of the students who took the test did better than Brian.
B. 64 of the students who took the test did worse than Brian.
C. 64% of the students who took the test did better than Brian.
D. 64% of the students who took the test did worse than Brian.

D. If Brian is in the 64th percentile, 64% of the students who took the test did worse than he did.

28. A taxi ride costs $3.00 for the first mile and $1.00 for each additional half-mile. What is the cost of a 10-mile ride?

A. $10
B. $12
C. $13
D. $21

D. In a 10-mile trip, after the first mile, there are 9 additional miles. If each additional half-mile is $1, then an additional mile is $2. The cost of the trip is $3 for the first mile + ($2 × 9) for the additional miles. $3 + $18 = $21.

29. Sandy bought $4\frac{1}{2}$ lbs of apples and 6 kiwi fruits. Brandon bought $3\frac{1}{4}$ lbs of apples and 9 kiwi fruits. If apples cost $1.39 per lb and kiwis are 2 for $1.00, how much more money did Sandy spend than Brandon?

A. $0.24
B. $0.94
C. $1.54
D. $2.32

A. The cost of Sandy's purchase is $(4\frac{1}{2} \times \$1.39) + (6 \times \$0.50) = \$9.26$. The cost of Brandon's purchase is $(3\frac{1}{4} \times \$1.39) + (9 \times \$0.50) = \$9.02$. Sandy spent $\$9.26 - \$9.02 = \$0.24$ more.

30. In a standard deck of playing cards, a king of hearts is drawn and not replaced. What is the probability of drawing another king from the deck?

A. $\frac{1}{4}$

B. $\frac{1}{13}$

C. $\frac{1}{17}$

D. $\frac{3}{52}$

C. Probability is $\frac{\text{number of successful outcomes}}{\text{number of possible outcomes}}$. Because one king was drawn and not replaced, three kings remain in the deck of 51 cards. So the probability of drawing another king is $\frac{3}{51} = \frac{1}{17}$.

31. A rope is made by linking beads that are $\frac{1}{2}$ inch in diameter. How many feet long is a rope made from 60 beads?

A. $2\frac{1}{2}$ ft

B. 10 ft

C. 30 ft

D. 120 ft

A. 60 beads $\times \frac{1}{2}$ inch = 30 inches. Converting this to feet gives 30 inches $\times \frac{1 \text{ foot}}{12 \text{ inches}} = \frac{30}{12} = 2\frac{1}{2}$ feet.

32. A foreign automobile manufacturer has a shipping charge of $3 per kilogram for all parts sent to the United States. To the nearest dollar, what would be the shipping charges for a motor weighing 200 pounds? Note that there are 0.455 kilograms in a pound.

A. $60

B. $132

C. $152

D. $273

D. Begin by changing the 200 pounds to kilograms.

$$200 \text{ pounds} \times \frac{0.455 \text{ kg}}{1 \text{ pound}} = 91 \text{ kg}$$

Now, at $3 per kilogram, the shipping charge would be $91 \times \$3 = \$273$.

33. While dining out, Chad spent $25.00. If the bill totaled $21.00 before the tip was added, approximately what percent tip did Chad leave?

A. 16%

B. 19%

C. 21%

D. 25%

B. The percent tip is the amount of tip over the total before tip. The amount of the tip is $25.00 – $21.00 = $4.00. The percent of the tip is $\frac{4}{21} = 0.19 = 19\%$.

34. What is the probability of rolling a sum of 9 using two dice?

A. $\frac{1}{4}$

B. $\frac{1}{9}$

C. $\frac{5}{12}$

D. $\frac{7}{36}$

B. There are four possible ways to roll a 9 using 2 dice: 3 and 6, 4 and 5, 5 and 4, and 6 and 3. The total number of possible outcomes when rolling 2 dice is 6^2 or 36. Therefore, the probability of rolling a 9 is $\frac{4}{36} = \frac{1}{9}$.

Problems 35 and 36 are based on the following situation.

In a test of car mileage, 5 cars were tested in both highway and city driving. The following data was recorded for the 5 cars.

Miles per Gallon					
Car #	***1***	***2***	***3***	***4***	***5***
Highway	20.5	25.3	24.3	27.1	22.9
City	16.9	19.5	17.8	20.2	16.1

35. What is the difference between the average (arithmetic mean) miles per gallon of the 5 cars for highway driving and the average (arithmetic mean) of the 5 cars for city driving?

A. 3.6 miles per gallon
B. 5.9 miles per gallon
C. 6.4 miles per gallon
D. 6.8 miles per gallon

B. The highway average is $\frac{20.5 + 25.3 + 24.2 + 27.1 + 22.9}{5} = 24$. The city driving average is $\frac{16.9 + 19.5 + 17.8 + 20.2 + 16.1}{5} = 18.1$. The difference between these two numbers is 24 – 18.1 = 5.9.

36. What is the range of the data values of the 5 cars for highway driving?

A. 4.2 miles per gallon
B. 4.8 miles per gallon
C. 6.6 miles per gallon
D. 24 miles per gallon

C. The range is the difference between the maximum and minimum values. This is equal to 27.1 – 20.5 = 6.6.

37. When Brett Bayne's flight from Tokyo arrives in Paris, he converts 50,000 yen into francs. If one U.S. dollar is worth 140 yen and one U.S. dollar is also worth 6 francs, approximately how many francs does he receive?

A. 63
B. 1,167
C. 2,143
D. 4,200

C. Begin by converting the yen to dollars; after this, we can convert the dollars to francs.

$$50{,}000 \text{ yen} \times \frac{1 \text{ dollar}}{140 \text{ yen}} = \$357.14. \text{ Then,}$$

$$\$357.14 \times \frac{6 \text{ francs}}{1 \text{ dollar}} = 2{,}142.8 \approx 2{,}143 \text{ francs.}$$

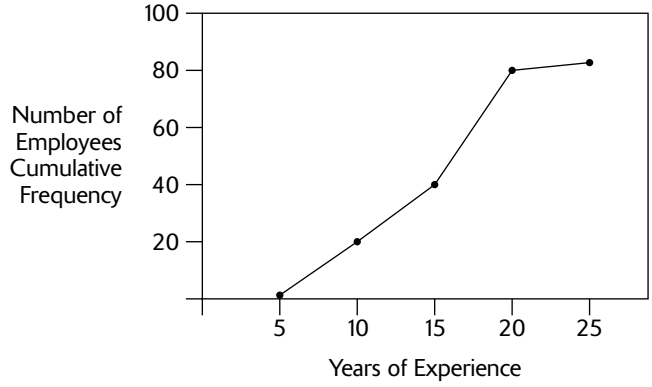
38. A savings account earns $2\frac{1}{4}\%$ interest each year. How much interest is earned on a $1,000 deposit after a 5-year period?

A. $22.50
B. $100.00
C. $112.50
D. $150.00

C. Interest = principle × rate × time. Thus, interest = $\$1{,}000 \times 2\frac{1}{4}\% \times 5 = \$1{,}000 \times 0.0225 \times 5 = \$112.50$

Questions 39–42 are based on the following situation.

A group of claims analysts at Empire Insurance were asked how many years of experience they had in the insurance industry. The results are shown in the following cumulative frequency graph.



39. According to the graph, approximately how many of the claims analysts surveyed had less than 5 years of experience?

A. none
B. 5
C. 10
D. 20

A. Because the graph starts at the point (5, 0), it indicates that no one had less than 5 years of experience.

40. Approximately how many employees took part in the survey?

A. 25
B. 83
C. 100
D. 225

B. Because the graph depicts the running total of the data collected, look at the point on the graph which is the farthest to the right. It appears to be approximately (25, 83). Because the second coordinate represents the running total of the number of people surveyed, it appears as if 83 people were surveyed.

41. Approximately how many of the employees had 15 years of experience or less?

A. 20
B. 30
C. 40
D. 50

C. Note that, on the graph, 15 years of experience is associated with 40 employees. Because this graph depicts a running total, you know that 40 employees had 15 years of experience or less.

42. Approximately how many of the employees had more than 20 years of experience?

A. 3
B. 40
C. 80
D. 140

A. Because 80 employees had 20 years of experience or less and there were a total of 83 people surveyed, only 3 employees had more than 20 years of experience.

Practice Tests

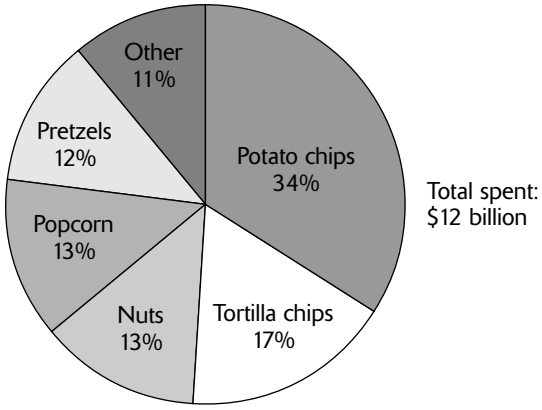
Directions: Following are three mini-practice tests. Select the choice that best answers each question. Fully explained answers follow each test.

Practice Test 1

1. A line on a blueprint measures 1.5 yards. If 1 yard is equivalent to 0.9 meters, approximately what is the length of the line in meters?

A. 0.6 meters
B. 1.35 meters
C. 1.67 meters
D. 2.4 meters

Problems 2–4 are based on the following graph.



2. What was the total amount spent on nuts and pretzels in 2005?

A. $1.44 billion
B. $1.56 billion
C. $3.0 billion
D. $3.12 billion

3. What was the ratio of money spent on potato chips to money spent on tortilla chips?

A. 2 : 1
B. 3 : 2
C. 1 : 2
D. 2 : 3

4. If 30% of the money spent on potato chips was spent on barbecued potato chips, approximately how much money was spent on barbecued potato chips?

A. $ 1.2 billion
B. $ 0.6 billion
C. $ 3.6 billion
D. $ 2.4 billion

5. Lauren earns $8.40 an hour plus an overtime rate equal to $1\frac{1}{2}$ times her regular pay for each hour worked beyond 40 hours. What are her total earnings for a 45-hour work week?

A. $336
B. $370
C. $399
D. $567

6. One phone plan charges a $20 monthly fee and $0.08 per minute on every phone call made. Another phone plan charges a $12 monthly fee and $0.12 per minute for each call. After how many minutes would the charge be the same for both plans?

A. 60 minutes
B. 90 minutes
C. 120 minutes
D. 200 minutes

7. Amelia casts a shadow 5 feet long. Her father, who is 6 feet tall, casts a shadow 8 feet long. How tall is Amelia?

A. 6 feet 8 inches
B. 4 feet 10 inches
C. 4 feet 6 inches
D. 3 feet 9 inches

8. Paul donates $\frac{4}{13}$ of his paycheck to his favorite charity. If he donates $26.80, what is the amount of his paycheck?

A. $8.25
B. $82.50
C. $87.10
D. $348.40

9. Tiling costs $2.89 per square foot. What is the cost to tile a kitchen with dimensions of 4 yards by 5 yards?

A. $57.80
B. $173.40
C. $289.00
D. $520.20

10. The scale on a map shows 500 feet for every $\frac{1}{4}$ inch. If two cities are 6 inches apart on the map, what is the actual distance they are apart?

A. 125 feet
B. 750 feet
C. 2,000 feet
D. 12,000 feet

Answers to Practice Test 1

1. B. $1.5 \text{ yards} \times \frac{0.9 \text{ meter}}{1 \text{ yard}} = 1.35 \text{ meters}$.

2. C. Nuts and pretzels together account for 13% + 12% = 25% of the $12 billion in snack sales. $12 billion × 25% = $3 billion.

3. A. The quickest way to do this is to work with the percents instead of the numbers. Therefore, the ratio can be expressed as 34 : 17, or 2 : 1.

4. A. Potato chips account for 34% of sales or $12 billion × 34% = $4.08 billion. Then, 30% of this amount would be the amount spent on barbequed potato chips. Thus, $4.08 billion × 30% ≈ $1.2 billion.

5. C. The overtime rate is $8.40 × 1.5 = $12.60. Five hours of overtime were completed, so the total earnings are ($8.40 × 40) + ($12.60 × 5) = $336 + $63 = $399.

6. D. Let m represent the minutes of the phone calls. The monthly charge for the first plan is $20 + 0.08m$. The monthly charge for the second plan is $12 + 0.12m$. When the monthly charges are the same, $20 + 0.08m = 12 + 0.12m$. Solve for m to find the number of minutes both plans have the same rate.

$$20 + 0.08m - 0.08m = 12 + 0.12m - 0.08m$$
$$20 = 12 + 0.04m$$
$$20 - 12 = 12 + 0.04m - 12$$
$$8 = 0.04m \text{ so } m = \frac{8}{0.04} = \frac{800}{4} = 200 \text{ minutes}$$

7. **D.** Using the ratio $\frac{\text{height}}{\text{shadow}}$, the proportion $\frac{x \text{ feet}}{5 \text{ feet}} = \frac{6 \text{ feet}}{8 \text{ feet}}$ can be used to find the unknown height. Cross multiply. $8x = 5 \times 6$, so $8x = 30$ and $x = \frac{30}{8} = 3\frac{3}{4}$ feet. Convert $\frac{3}{4}$ feet to inches. $\frac{3}{4} \times 12 = 9$ inches. The height is, therefore, 3 feet 9 inches.

8. **C.** Let p represent the amount of the paycheck. $\frac{4}{13}p = \$26.80$, so $p = \$26.80 \cdot \frac{13}{4} = \$87.10$.

9. **D.** There are 3 feet in a yard, so a kitchen 4 yards by 5 yards is equivalent to (4×3) feet by (5×3) feet, or 12 feet by 15 feet. The area of the kitchen is $12 \times 15 = 180$ square feet. The cost to tile is $\$2.89 \times 180 = \$520.20$.

10. **D.** The proportion $\frac{500 \text{ ft}}{\frac{1}{4} \text{ in}} = \frac{x \text{ ft}}{6 \text{ in}}$ can be used to find the number of actual distance. Cross multiply. $500 \times 6 = \frac{1}{4}x$, so $3{,}000 = \frac{1}{4}x$ and $x = 3{,}000 \times 4 = 12{,}000$ ft.

Practice Test 2

Problems 1–2 are based on the following situation.

At Erie County Community College, there are seven different classes of students taking Calculus I. The number of students in these classes is 18, 22, 16, 25, 19, 17, and 18.

1. What is the median size of a Calculus I class?

   A. 17
   B. 18
   C. 19
   D. 22

2. Which of the following statements is true?

   A. The modal Calculus I class size is less than the median class size.
   B. The modal Calculus I class size is equal to the median class size.
   C. The modal Calculus I class size is greater than the median class size.
   D. The given data is bimodal.

3. Doug earns 15% commission on all sales over $5,000. Last month, his sales totaled $12,500. What were Doug's earnings?

   A. $750
   B. $1,125
   C. $1,875
   D. $2,625

4. Three boxes are needed to hold 18 reams of paper. How many boxes are needed for 90 reams?

   A. 5
   B. 6
   C. 9
   D. 15

5. Kyle ran 3 miles in $17\frac{1}{2}$ minutes on Saturday, $4\frac{1}{2}$ miles in 22 minutes on Sunday, and 2 miles in 9 minutes on Monday. What was Kyle's average rate of speed while running?

A. 1.6 minutes per mile
B. 5.1 minutes per mile
C. 16.2 minutes per mile
D. 17.8 minutes per mile

6. On a map, 1 centimeter represents 4 miles. A distance of 10 miles would be how far apart on the map?

A. $1\frac{3}{4}$ cm
B. 2 cm
C. $2\frac{1}{2}$ cm
D. 4 cm

7. Cards normally sell for $3.00 each. How much is saved if 5 cards are purchased on sale for 2 for $5.00?

A. $2.50
B. $5.00
C. $12.50
D. $15.00

8. If 3 cans of soup cost $5.00, how much do 10 cans cost?

A. $15.00
B. $16.45
C. $16.67
D. $17.33

9. Staci earns $9.50 an hour plus 3% commission on all sales made. If her total sales during a 30-hour work week were $500, how much did she earn?

A. $15
B. $250
C. $285
D. $300

10. The girl's basketball team won three times as many games as they lost. How many games were won if they played a total of 24 games?

A. 6
B. 8
C. 12
D. 18

Answers to Practice Test 2

1. B. Begin by putting the numbers of students in numerical order: 16, 17, 18, 18, 19, 22, 25. Because there are an odd number of numbers, the median will be the number in the middle, which is 18.

2. B. The mode is the most frequently occurring number, which is 18. Thus, the mode and the median are the same.

3. **B.** The amount of commissions over \$5,000 is \$12,500 – \$5,000 = \$7,500. Earnings are \$7,500 × 15% = \$1,125.

4. **D.** The proportion $\frac{3 \text{ boxes}}{18 \text{ reams}} = \frac{x \text{ boxes}}{90 \text{ reams}}$ can be used to find the number of boxes. Cross multiply. $3 \times 90 = 18x$ so $270 = 18x$ and $x = \frac{270}{18} = 15$ boxes.

5. **B.** Average is the total time divided by the total miles run. The total time is 17.5 + 22 + 9 = 48.5 minutes. The total number of miles run is 3 + 4.5 + 2 = 9.5. The average is $\frac{48.5}{9.5} = 5.1$ minutes per mile.

6. **C.** The proportion $\frac{1 \text{ cm}}{4 \text{ miles}} = \frac{x \text{ cm}}{10 \text{ miles}}$ models this situation. Cross multiply. $1 \times 10 = 4x$ so $10 = 4x$ and $x = \frac{10}{4} = 2\frac{1}{2}$ cm.

7. **A.** Five cards at \$3.00 each cost 5 × \$3.00 = \$15.00. If cards are 2 for \$5.00, the cost per cards is $\frac{\$5.00}{2} = \$2.50$, so 5 cards would cost \$2.50 × 5 = \$12.50. The amount saved is \$15.00 – \$12.50 = \$2.50.

8. **C.** The proportion $\frac{\$5.00}{3 \text{ cans}} = \frac{\$x}{10 \text{ cans}}$ can be used to find the cost of 10 cans. Cross multiply. $5 \times 10 = 3x$, so $50 = 3x$ and $x = \frac{50}{3} = \$16.67$.

9. **D.** For a 30-hour week with \$500 in sales, total earnings are (30 × \$9.50) + (3% × \$500) = \$285 + \$15 = \$300.

10. **D.** Let w represent the games won and l represent the games lost. Then $w = 3 \times l = 3l$. The total number of games played is $w + l = 24$. Substituting $3l$ in for w yields $3l + l = 24$ or $4l = 24$. The number of losses is $\frac{24}{4} = 6$ and the number of wins is 24 – 6 = 18.

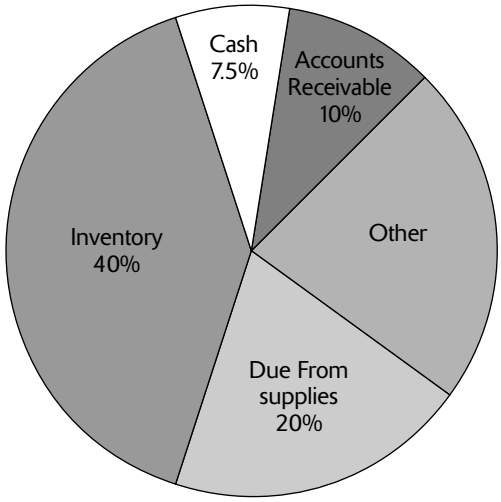
Practice Test 3

1. While driving in Canada, Dave sees a sign that says that the distance to the next exit is 80 kilometers. If a mile is approximately equal to 1.6 kilometers, what is the distance to the next exit in miles?

   A. 50 miles
   B. 54 miles
   C. 128 miles
   D. 200 miles

Problems 2–4 are based on the following graph.

The following circle graph shows the distribution of a company's current assets.



2. If the company has $30 million in cash, what is the total amount of its current assets?

A. $225 million
B. $250 million
C. $380 million
D. $400 million

3. How much more money does the company have in inventory than in accounts receivable?

A. $30 million
B. $60 million
C. $120 million
D. $200 million

4. How much money does the company have in other current assets?

A. $56 million
B. $85 million
C. $90 million
D. $178 million

5. While on a trip to Denmark, Hazel buys a dress that costs 3,500 krones. If there are 7.1 krones in a U.S. dollar, what is the cost of the dress (to the nearest dollar) in U.S. dollars?

A. $203
B. $249
C. $476
D. $493

6. The quality control department examines a random sample of 450 motors and determines that 9 of them have been assembled incorrectly. At this rate, how many motors would be incorrectly assembled in a shipment of 2,000 motors?

A. 40
B. 42
C. 44
D. 46

Problems 7–8 are based on the following situation.

Eight employees were asked to contribute to a going-away party for a co-worker. The amounts that were contributed were $15, $5, $20, $20, $25, $40, $35, and $30.

7. What is the difference between the mean contribution and the median contribution?

A. $0.75
B. $1.00
C. $1.25
D. $1.50

8. If the employee who contributed $5 to the party reconsidered and contributed $10 instead, which of the following would not change?

A. the range of the contributed amounts
B. the mean of the contributed amounts
C. the median of the contributed amounts
D. the total of the contributed amounts

9. A printer originally priced at $240 is on sale for $180. By what percent has the price been discounted?

A. 25%
B. $33\frac{1}{3}\%$
C. $66\frac{2}{3}\%$
D. 75%

10. A computer hardware manufacturing company has a shipping charge of $2.75 per kilogram for all parts sent to the United States. If 1 kilogram is approximately equal to 2.2 pounds, what would be the shipping charge, rounded to the nearest dollar, for a part that weighs 44 pounds?

A. $55
B. $73
C. 138
D. $151

Answers to Practice Test 3

1. A. $80 \text{ km} \times \frac{1 \text{ mile}}{1.6 \text{ km}} = 50 \text{ miles}$

2. D. The $30 million that the company has in cash represents 7.5% of its current assets.

$$\frac{30}{7.5\%} = \frac{30}{0.075} = \$400 \text{ million in current assets}$$

3. C. Of the current assets, 40% are in inventory and 10% are in accounts receivable. The difference between the two, then, is 30%. The total amount of current assets is $400 million. Finally, 30% × $400 = $120 million.

4. C. Because the percentages in a circle graph must total 100%, the amount in the "Other" category must represent 22.5% of the total. Then, 22.5% × 400 = $90 million.

5. D. $3{,}500 \text{ krones} \times \frac{1 \text{ dollar}}{7.1 \text{ krones}} = \$492.9 \approx \$493$.

6. A. This problem can be solved by using a proportion.

$$\frac{\text{incorrect}}{\text{total}} \xrightarrow{\rightarrow} \frac{9}{450} = \frac{x}{2{,}000}. \text{ Cross-multiply.}$$

$$2{,}000 \times 9 = 450x$$

$$18{,}000 = 450x. \text{ Divide by 450.}$$

$$x = 40$$

7. C. To find the median, put the contributed amounts in numerical order: $5, $15, $20, $20, $25, $30, $35, $40. The median of an even number of numbers is the mean of the two numbers in the middle. These two numbers are $20 and $25, so the median is $22.50. To find the mean, add all eight numbers and divide by 8. The mean is $23.75. The difference between the mean and the median, then, is $23.75 – $22.50 = $1.25.

8. **C.** Changing the $5 to $10 does not change the numbers in the middle, so the median remains the same. The total amount and the mean would be larger, and the range would be smaller.

9. **A.** The amount of the discount is $240 – $180 = $60. This amount is 25% of the original value of $240.

10. **A.** $44 \text{ pounds} \times \frac{1 \text{ kg}}{2.2 \text{ pounds}} = 20$ kg. 20 kg × $2.75 per kg. = $55.