

# Numeration, Patterns, and Relationships

Read each question. Then mark your answer on the sheet.

1. What is  $(4 \times 10^{10}) + (7 \times 10^8)$  in standard form?

A 47,000,000,000  
B 40,700,000,000  
C 4,700,000,000  
D 4,070,000,000

2. Which submarine is closest to the surface?

Submarine	Depth
Yellow	-30 ft
Green	-60 ft
Blue	-50 ft
Red	-40 ft

A Yellow  
B Green  
C Blue  
D Red

3. Of the numbers  $-\frac{3}{8}$ ,  $\frac{4}{7}$ , 0.3, and 0.5, which is farthest to the right on a number line?

A  $-\frac{3}{8}$   
B  $\frac{4}{7}$   
C 0.3  
D 0.5

4. What is  $-2 + (-9)$ ?

A -11                      C 7  
B -7                         D 11

5. Campsite A is at an altitude of -25 ft. Campsite B is at an altitude of -42 ft. How much higher is Campsite A than Campsite B?

A 7 ft  
B 12 ft  
C 17 ft  
D 67 ft

6. Maurice shot 2 under par, or -2, on each of the first 4 holes of golf. What is his score with respect to par after the fourth hole?

A 8                              C -4  
B 4                                D -8

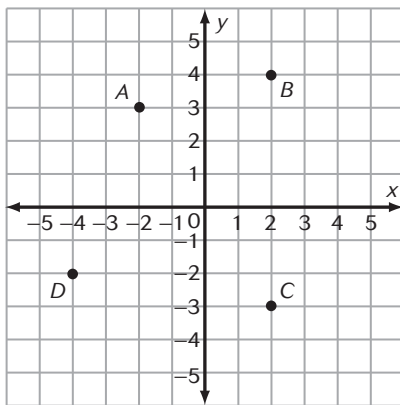
7. The temperature dropped 12 degrees in 3 hours. What was the average change in temperature each hour?

A  $-9^\circ$                          C  $4^\circ$   
B  $-4^\circ$                          D  $9^\circ$

**Numeration, Patterns, and Relationships (continued)**

Read each question. Then mark your answer on the sheet.

8. What are the coordinates of point *D*?



- A  $(-4, -2)$       C  $(2, 4)$   
B  $(2, -3)$       D  $(-2, 3)$

9. Write an expression to describe the relationship in the table.

<i>m</i>	0	5	6	8
<i>n</i>	-1	9	11	15

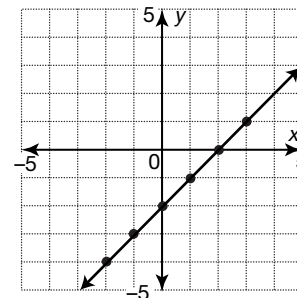
- A  $3m + 1$       C  $\frac{m}{2} + 1$   
B  $2m - 1$       D  $1 + 4m$

10. Carla earns \$5 each time she rakes the leaves. Use the table to find the equation that represents this situation.

<b>Rakes</b>	<i>x</i>	1	2	3	4
<b>Money</b>	<i>y</i>	5	10	15	20

- A  $y = x + 4$       C  $y = 5x$   
B  $y = x + 5$       D  $y = x - 5$

11. Jamal drew the graph shown. Which equation did he use?



- A  $y = x - 2$   
B  $y = x + 2$   
C  $y = 2x$   
D  $y = x \div 2$

12. Which computation should you do first to evaluate this expression?

$$9 - 5 \times 1 + 18 \div 2 + 5$$

- A  $9 - 5$   
B  $1 + 18$   
C  $18 \div 2$   
D  $5 \times 1$

13. A pound is 16 ounces. Which expression shows the number of ounces in *p* pounds?

- A  $16p$   
B  $16 - p$   
C  $16 + p$   
D  $16 \div p$

**Numeration, Patterns, and Relationships** (continued)

Read each question. Then mark your answer on the sheet.

14. Name the property used in the equation.

$$(7 \times 4) \times 12 = 7 \times (4 \times 12)$$

- A Distributive Property
- B Associative Property
- C Commutative Property
- D Zero Property

15. Solve the equation

$$10.8 = n - 2.4.$$

- A  $n = 8.0$
- B  $n = 8.4$
- C  $n = 12.2$
- D  $n = 13.2$

16. You pay \$63.43 for a video game. The amount includes a tax of \$3.48. Which equation can be used to find  $c$ , the cost of the video game before tax?

- A  $c + 3.48 = 63.43$
- B  $c - 3.48 = 63.43$
- C  $c + 63.43 = 3.48$
- D  $c - 63.43 = 3.48$

17. Solve  $x - \frac{3}{4} = 2\frac{3}{8}$ .

- A  $x = 1\frac{5}{8}$
- B  $x = 3\frac{1}{8}$
- C  $x = 3\frac{1}{6}$
- D  $x = 3\frac{1}{2}$

18. Solve  $16h = 2\frac{2}{3}$ .

- A  $h = \frac{1}{6}$
- B  $h = 13\frac{1}{3}$
- C  $h = 18\frac{2}{3}$
- D  $h = 42\frac{2}{3}$

19. Solve  $5t = -35$ .

- A  $t = 245$
- B  $t = 7$
- C  $t = -7$
- D  $t = -245$

20. Solve  $2x - 5 = 17$ .

- A  $x = 6$
- B  $x = 11$
- C  $x = 24$
- D  $x = 44$

## Operations with Whole Numbers

Read each question. Then mark your answer on the sheet.

---

21. Traci wants to find  $3 \times 498$  mentally. Which of the following strategies should she use?

- A  $(3 \times 400) - (3 \times 90)$
  - B  $(3 \times 400) + (3 \times 90)$
  - C  $(3 \times 500) + (3 \times 2)$
  - D  $(3 \times 500) - (3 \times 2)$
- 

22. Which equals  $2^7$ ?

- A 14
  - B 32
  - C 64
  - D 128
- 

23. Which is the prime factorization of 48?

- A  $2^3 \times 3$
  - B  $2^4 \times 3$
  - C  $3 \times 16$
  - D  $6 \times 8$
- 

24. Which number is divisible by 3?

- A 46
  - B 58
  - C 96
  - D 101
- 

25. What is the GCF of 15 and 20?

- A 3
  - B 4
  - C 5
  - D 9
- 

26. Maria's parents do not have to work this Saturday. Her mom gets every sixth day off. Her dad gets every fourth day off. How long will it be until they both get a day off together again?

- A 12 days
  - B 24 days
  - C 84 days
  - D 96 days
- 

27. The art teacher has 36 small sticks and 60 pipe cleaners for art projects. He wants to make kits for the students using all the sticks and pipe cleaners. All the kits must be alike. He wants to make as many kits as possible. What is the greatest number of kits he can make?

- A 8 kits
- B 9 kits
- C 12 kits
- D 36 kits

**Fractions, Decimals, and Percents**

Read each question. Then mark your answer on the sheet.

28. Gina works in a shoe store. During a sale, she sold 42 pairs of shoes. Before the sale started, there were 84 pairs of shoes in stock. In simplest form, what fractional part of the stock did Gina sell?

- A  $\frac{3}{4}$   
B  $\frac{1}{2}$   
C  $\frac{1}{3}$   
D  $\frac{1}{6}$

29. Which of the following shows numbers in order from least to greatest?

- A 3.1, 2.99, 2.9, 0.31  
B 2.9, 2.99, 0.31, 3.1  
C 0.31, 2.99, 2.9, 3.1  
D 0.31, 2.9, 2.99, 3.1

30. Which number does not equal  $\frac{22}{8}$ ?

- A  $2\frac{3}{4}$   
B 2.25  
C 2.75  
D  $2\frac{6}{8}$

31. Jamie's cat weighs  $6\frac{1}{4}$  pounds. Her dog weighs  $9\frac{7}{8}$  pounds. About how much more does Jamie's dog weigh than her cat?

- A About 3 pounds  
B About 4 pounds  
C About 5 pounds  
D About 6 pounds

---

32. 
$$\begin{array}{r} 7\frac{1}{4} \\ - 5\frac{3}{8} \\ \hline \end{array}$$

- A  $1\frac{7}{8}$   
B  $2\frac{1}{8}$   
C  $2\frac{1}{2}$   
D  $2\frac{7}{8}$

---

33. Kira gave handball lessons for  $5\frac{3}{4}$  hours on Saturday and  $3\frac{2}{3}$  hours on Sunday. How many hours did she teach in all?

- A  $10\frac{5}{12}$  hours  
B  $9\frac{5}{12}$  hours  
C  $8\frac{5}{12}$  hours  
D  $2\frac{1}{12}$  hours

**Fractions, Decimals, and Percents** (continued)

Read each question. Then mark your answer on the sheet.

**34. How many one-eighths are in 2?**

- A  $\frac{1}{16}$                       C 8  
B  $\frac{2}{8}$                         D 16

---

**35. During a race Li averaged  $10\frac{2}{5}$  miles per hour for  $2\frac{3}{5}$  hours. Which is the best estimate of the total distance he ran?**

- A 20 miles  
B 22 miles  
C 30 miles  
D 33 miles

---

**36. What is  $2\frac{5}{8} \times \frac{2}{7}$ ?**

- A  $\frac{1}{2}$   
B  $\frac{3}{4}$   
C  $1\frac{1}{7}$   
D  $9\frac{3}{16}$

---

**37. What is  $3\frac{2}{3} \div \frac{5}{6}$ ?**

- A  $4\frac{2}{5}$   
B  $3\frac{4}{5}$   
C  $3\frac{1}{18}$   
D  $2\frac{2}{3}$

**38.  $12.9 + 6.78 + 1.058 =$** 

- A 20.738  
B 21.738  
C 30.26  
D 91.28

---

**39.  $0.08 \times 0.09 =$** 

- A 0.72                      C 0.0072  
B 0.072                     D 0.00072

---

**40. Mr. Littleton bought 67.5 pounds of hamburger. He wants to separate it into packages of 1.5 pounds. How many packages can he make?**

- A 38 packages  
B 43 packages  
C 45 packages  
D 48 packages

---

**41. Mr. Jones earns about 75,320 frequent flier miles per year. What is this number written in scientific notation?**

- A  $75.320 \times 10^3$   
B  $7.532 \times 10^3$   
C  $7.532 \times 10^4$   
D  $0.7532 \times 10^4$

**Fractions, Decimals, and Percents (continued)**

Read each question. Then mark your answer on the sheet.

42. There are 6 squares, 9 rectangles, and 8 circles. What is the ratio of circles to rectangles?

A  $\frac{6}{9}$                       C  $\frac{8}{9}$   
 B  $\frac{8}{6}$                       D  $\frac{9}{6}$

43. Which store has the best buy on acrylic paint? What is its unit price?

Painter's Palette	
acrylic paint	2 for \$7.50
brushes	2 for \$5.25

The Hobby Shop	
acrylic paint	3 for \$9.79
brushes	4 for \$10.99

Art World	
acrylic paint	6 for \$18.99
brushes	3 for \$9.50

- A The Hobby Shop; \$3.27  
 B Art World; \$3.75  
 C Art World; \$3.17  
 D The Hobby Shop; \$3.17

44. A recipe calls for 1.5 cups of flour and 0.75 cup of sugar. Which proportion can be used to find  $f$ , the amount of flour needed to make this recipe with 1.25 cups of sugar?

A  $\frac{1.5}{0.75} = \frac{f}{1.25}$       C  $\frac{f}{1.5} = \frac{0.75}{1.25}$   
 B  $\frac{1.5}{0.75} = \frac{1.25}{f}$       D  $\frac{1.5}{f} = \frac{1.25}{0.75}$

45. You are making a scale drawing of your bedroom using a scale of 1 inch = 1.5 feet. The actual width of your bedroom is 12 feet. What width should your bedroom be on the scale drawing?

A 6 in.                      C 9 in.  
 B 8 in.                      D 18 in.

46. The formula  $d = rt$  gives the relationship among distance,  $d$ , rate of speed,  $r$ , and time,  $t$ . Use the formula to find how long it would take to travel 217 miles at 62 miles per hour.

A 2 hours                      C 3 hours  
 B 2.5 hours                      D 3.5 hours

47. Which is the best estimate of 9% of 249?

A 2.5                      C 25  
 B 20                      D 30

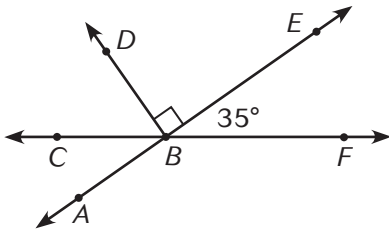
48. You buy a pair of jeans that normally cost \$35.99 for 25% off. Sales tax is 4.5%. How much do you pay?

A \$9.45  
 B \$26.99  
 C \$28.07  
 D \$28.21

# Measurement and Geometry

Read each question. Then mark your answer on the sheet.

Use the figure for Questions 49 and 50.



49. Which angle is complementary to  $\angle DBC$ ?

- A  $\angle CBA$
- B  $\angle EBA$
- C  $\angle DBF$
- D  $\angle DBE$

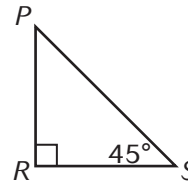
50. What is the measure of  $\angle CBE$ ?

- A  $35^\circ$
- B  $55^\circ$
- C  $145^\circ$
- D  $165^\circ$

51. How many edges does a pentagonal prism have?

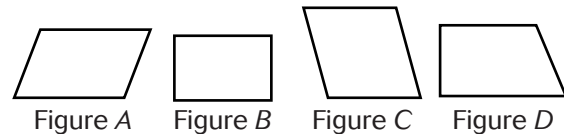
- A 15
- B 12
- C 10
- D 5

52. Find the measure of  $\angle P$ .



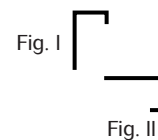
- A  $35^\circ$
- B  $45^\circ$
- C  $55^\circ$
- D  $125^\circ$

53. Which figure is a parallelogram with all 4 sides congruent?



- A Figure A
- B Figure B
- C Figure C
- D Figure D

54. What type of transformation was used to move Figure I to Figure II?



- A Translation
- B Rotation
- C Reflection
- D Glide



**Measurement and Geometry (continued)**

Read each question. Then mark your answer on the sheet.

55. There are 30 quarts of milk on the grocery's shelves. How many gallons is this?

- A 60 gallons
- B 8 gallons
- C 7.5 gallons
- D 6 gallons

56. Find the missing number.

$$92 \text{ mL} = \blacksquare \text{ L}$$

- A 0.092
- B 0.92
- C 920
- D 92,000

57. About how many pounds is 9 kilograms?

$$1 \text{ kg} \approx 2.2 \text{ lb}$$

- A 5 pounds
- B 10 pounds
- C 20 pounds
- D 40 pounds

58. Subtract.  $23 \text{ h } 35 \text{ min}$   
 $- 15 \text{ h } 17 \text{ min}$

- A 8 h 18 min
- B 8 h 52 min
- C 38 h 18 min
- D 38 h 52 min

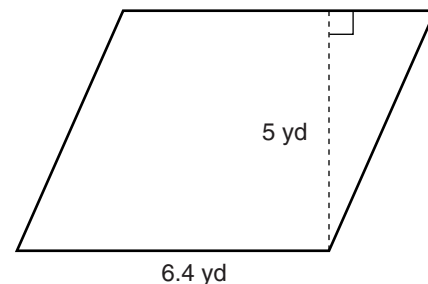
59. Which measurement is most precise?

- A 5 mm
- B 5 cm
- C 50 cm
- D 0.5 m

60. The perimeter of a rectangular park is 840 yards. The park is 170 yards wide. If  $\ell$  stands for the length of the park, which equation can be used to find  $\ell$ ?

- A  $840 - 2\ell = 170$
- B  $2\ell + 340 = 840$
- C  $\ell + 340 = 840$
- D  $170\ell = 840$

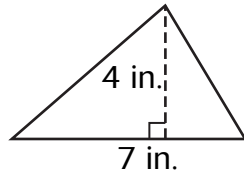
61. Find the area of the parallelogram.



- A  $32 \text{ yd}^2$
- B  $30.2 \text{ yd}^2$
- C  $30 \text{ yd}^2$
- D  $22.8 \text{ yd}^2$

**Measurement and Geometry** (continued)

Read each question. Then mark your answer on the sheet.

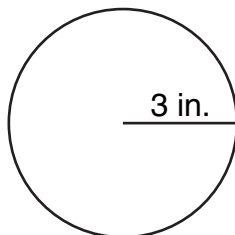
**62. Find the area of the triangle.**

- A** 14 in.<sup>2</sup>  
**B** 28 in.<sup>2</sup>  
**C** 30 in.<sup>2</sup>  
**D** 56 in.<sup>2</sup>

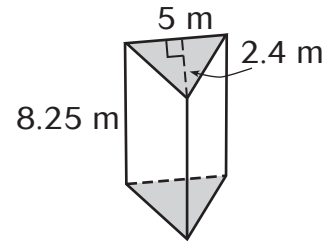
**63. A water sprinkler in the center of a garden shoots water for a distance of 4 m in all directions. Caleb plans to put a small fence around the area being watered. How long should the fence be? Use 3.14 for  $\pi$ .**

- A** 6.28 m      **C** 12.66 m  
**B** 12.56 m      **D** 25.12 m

**64. What is the area of the circle, rounded to the nearest whole number? Use 3.14 for  $\pi$ .**

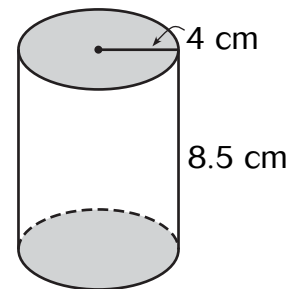


- A** 9 in.<sup>2</sup>      **C** 28 in.<sup>2</sup>  
**B** 19 in.<sup>2</sup>      **D** 113 in.<sup>2</sup>

**65. Find the volume of the prism.**

- A** 12 m<sup>3</sup>  
**B** 48.5 m<sup>3</sup>  
**C** 49.5 m<sup>3</sup>  
**D** 99 m<sup>3</sup>

**66. Find the surface area of the cylinder below. Use 3.14 for  $\pi$ .**

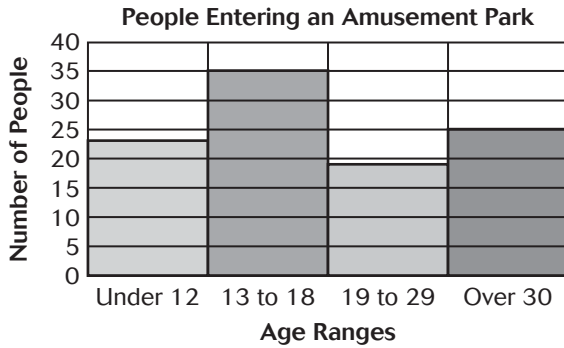


- A** About 427 cm<sup>2</sup>  
**B** About 314 cm<sup>2</sup>  
**C** About 72 cm<sup>2</sup>  
**D** About 50 cm<sup>2</sup>

# Data Analysis and Probability

Read each question. Then mark your answer on the sheet.

67. The histogram shows the ages of people who entered an amusement park the first hour of opening day.



The frequency table below was used to make the histogram. What is the missing number in the table?

Age Range	Frequency
Under 12	23
13 to 18	?
19 to 29	19
Over 30	25

- A 37                      C 32  
B 35                      D 18

68. In a survey of 100 people, 25 said their favorite amusement park ride is the roller coaster. Susi is making a circle graph of the results. What fraction of the graph should she make the roller coaster sector?

- A  $\frac{1}{4}$                       C  $\frac{2}{5}$   
B  $\frac{1}{3}$                       D  $\frac{1}{2}$

69. Which is the most appropriate display for the favorite activities of children at summer camp?

- A Bar graph  
B Line graph  
C Circle graph  
D Stem-and-leaf plot

70. The stem-and-leaf diagram shows the number of school bus riders during May. Find the median of the data.

Stem	Leaf
1	0 2 5 5 8 8
2	1 3
3	0 2 6 8 9

- A 1                      C 21  
B 18                      D 22

71. The following represent amounts Thom earned babysitting.

\$17   \$20   \$17   \$33   \$22   \$23

What is Thom's mean income?

- A \$17  
B \$21  
C \$22  
D \$33

**Data Analysis and Probability** (continued)

Read each question. Then mark your answer on the sheet.

---

**72. Each set of data below gives the heights of 4 trees, in feet. For which set of data does the median give a better indication of the typical height than the mean?**

- A** 12, 26, 35, 14
  - B** 15, 18, 11, 22
  - C** 19, 16, 43, 10
  - D** 36, 28, 19, 32
- 

**Use the following for Questions 73 and 74.**

**To learn what voters think about a tax to build a new gym, you send a questionnaire to parents of sixth-grade students.**

**73. What is the population being studied?**

- A** Sixth-grade students
  - B** Parents of sixth-grade students
  - C** People who use the gym
  - D** Voters in the school district
- 

**74. Which question is most fair?**

- A** Are you willing to pay extra taxes?
  - B** Will you vote for or against the tax for a new gym?
  - C** Do you want a new gym?
  - D** Will you vote for the tax?
- 

**75. Identify the sampling method: A person asks those entering a mall about their favorite beverage.**

- A** Random sampling
  - B** Responses to a survey
  - C** Convenience sampling
  - D** Systematic sampling
- 

**76. Which sample is likely to be unbiased?**

- A** Choosing random phone numbers to ask people their preferred cleaning product.
  - B** Having a candidate ask voters whom they plan to vote for.
  - C** Asking readers to return a survey about their income.
  - D** Asking the Spanish club their preferred eating establishment.
- 

**77. Mrs. Arnold is planning dinner. She has 4 choices of a main dish: chicken, meatloaf, hamburgers, and fish. She has 2 choices of vegetables: beans and peas. How many different meals could she prepare with one choice of each main dish and vegetable?**

- A** 6
- B** 8
- C** 12
- D** 16

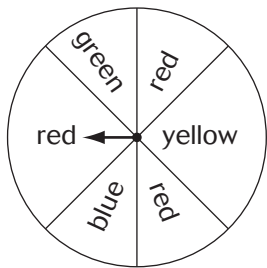
**Data Analysis and Probability** (continued)

Read each question. Then mark your answer on the sheet.

78. There are 6 class officers. How many ways can 2 of these students be selected to serve on a committee?

A 60                      C 15  
B 30                      D 12

Use the spinner for Questions 79–81.



79. You spin the spinner once. Find  $P$ (not red).

A  $\frac{3}{8}$                       C  $\frac{5}{8}$   
B  $\frac{1}{2}$                       D  $\frac{3}{4}$

80. You spin the spinner once. Find  $P$ (red).

A 37.5%                      C 62.5%  
B 50%                      D 75%

81. You spin the spinner twice. Find  $P$ (red, red).

A  $\frac{1}{64}$                       C  $\frac{1}{4}$   
B  $\frac{9}{64}$                       D  $\frac{3}{4}$

82. Suzanne got 12 hits in her first 18 times at bat. She expects to bat 3 times in today's game. How many hits should she get?

A None  
B 1 hit  
C 2 hits  
D 3 hits

Use the following for Questions 83 and 84.

The letters of the word MIDDLE are placed in a bag. You draw two letters without looking.

83. What is the probability both letters drawn are D?

A  $\frac{1}{15}$   
B  $\frac{1}{9}$   
C  $\frac{8}{15}$   
D  $\frac{2}{3}$

84. Which best describes the events of drawing two Ds from the bag?

A Dependent events  
B Independent events  
C Mutually exclusive events  
D Complementary events

## Problem Solving

Read each question. Then mark your answer on the sheet.

---

**85.** The fruit market has peaches for \$1.49 per pound and apples for \$1.29 per pound. What is the total cost of 4 pounds of peaches and 2 pounds of apples?

- A \$5.16
  - B \$5.96
  - C \$8.14
  - D \$8.54
- 

**86.** Movie tickets cost \$5.00 for children and \$8.00 for adults. On Thursday, the movie theater sold 110 tickets and collected \$820. How many children's tickets were sold?

- A 90 tickets
  - B 45 tickets
  - C 20 tickets
  - D 10 tickets
- 

**87.** Al played a game and finished with 62 points. During the game he earned 300 points, lost 250 points, earned 15 points, lost 25 points, and lost 10 points. How many points did Al have at the beginning of the game?

- A 16
  - B 30
  - C 32
  - D 178
- 

**88.** Kira and Joe are playing a game. They toss 3 plastic chips which are red on one side and blue on the other side. If exactly 2 chips turn up red, Joe gets a point. Otherwise, Kira gets a point. Make a list of all possible outcomes and use it to explain why the game is or is not fair.

RRR  
RRB  
RBB

- A The game is not fair because only 3 out of 8 possible outcomes have exactly 2 red.
  - B The game is not fair because only 1 out of 4 possible outcomes have exactly 2 red.
  - C The game is fair because 4 out of 8 possible outcomes have exactly 2 red.
  - D The game is fair because 2 out of 4 possible outcomes have exactly 2 red.
- 

**89.** It is normal to leave a 15% to 20% tip in a restaurant. Which of the following is the only reasonable tip to leave on a \$26.55 bill?

- A \$2.66
- B \$4.00
- C \$12.00
- D \$25.00