Beginning-of-Year Diagnostic Test

1. At 7 P.M. the temperature was 5°F. At midnight the temperature was −7°F. What was the change in temperature?

   A −12°F   C 5°F

   B −7°F   D 12°F

2. What is the product of −12(−5)?

   A −60   C 48

   B −48   D 60

3. What is true about the relationship between miles and gallons?

gallons	2	4	6	8
miles	30	60	90	120

   A There is no relationship between miles and gallons.

   B There is a proportional relationship between miles and gallons

   C There is a 1 to 15 relationship between miles and gallons.

   D There is a 30 to 1 relationship between miles and gallons

4. Which decimal is equivalent to $\frac{4}{20}$?

   A 0.2   C 1.4

   B 0.6   D 4.2

5. At the farmers' market, you can buy 3 jars of honey for $12, 6 jars of honey for $24, or 9 jars of honey for $36. What is the constant of proportionality for buying jars of honey?

   A 3   C 6

   B 4   D 12

6. Andrella makes bead bracelets. Each bracelet is 7 inches long. Andrella has a 67-inch length of beaded string. How many necklaces can she make?

   A 7 necklaces   C 10 necklaces

   B 9 necklaces   D 11 necklaces

7. The ground temperature at sea level is 60°F. For every 100-foot increase in elevation, the temperature rises $\frac{1}{10}$ of one degree. At an altitude of 2,000 feet, what will be the likely temperature?

   A 58°F   C 72°F

   B 62°F   D 80°F

8. Tamara walked $\frac{3}{4}$ mile in $\frac{1}{2}$ hour. Which of the following represents the unit rate that Tamara walked?

   A $\frac{1}{2}$ mi/h   C $\frac{3}{4}$ mi/h

   B $\frac{2}{3}$ mi/h   D $1\frac{1}{2}$ mi/h

9. Simplify $\frac{1}{2}(2a + b) − (4a + b)$.

   A $−3a − \frac{1}{2}b$ C $−3a + \frac{3}{2}b$

   B $−2a + 2b$ D $−3a − b$

10. Jay spent $6.40 to buy 4 muffins. How much will 9 muffins cost?

   A $12.03   C $14.40

   B $12.80   D $144.00

11. A reduced scale drawing of a rectangle measures 12 inches by 16 inches. The scale factor is $\frac{1}{4}$. What is the size of the original rectangle?

   A 3 in. × 4 in.   C 36 in. × 48 in.

   B 16 in. × 20 in.   D 48 in. × 64 in.

12. Which fraction is equivalent to −0.12?

   A $−\frac{3}{25}$ C $−\frac{4}{25}$

   B $−\frac{7}{50}$ D $−\frac{6}{25}$

Beginning-of-Year Diagnostic Test

13. The cost of 2 pounds of coffee is $17.95. To the nearest dollar, what is the cost of 5 pounds of coffee?

   A $34   C $45

   B $36   D $90

14. On a map, the distance between two cities is 5.25 inches. The map scale is 1 in.:25 mi To the nearest mile, what is the actual distance between the two cities?

   A 13 mi   C 125 mi

   B 30 mi   D 131 mi

15. Patti got a new part-time job. Her hourly wage increased from $10.50 to $12.39. What was the percent increase in Patti's hourly wage?

   A 1.8%   C 18%

   B 15.25%   D 189%

16. To the nearest cubic centimeter, what is the volume of the prism below?
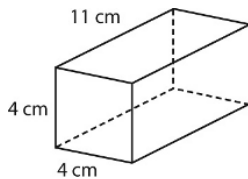
   A 19 cm^3 C 88 cm^3

   B 44 cm^3 D 176 cm^3

17. A bag contains 12 blue marbles, 5 red marbles, and 3 green marbles. Jonas selects a marble and then returns it to the bag before selecting a marble again. If Jonas selects a blue marble 4 out of 20 times, what is the experimental probability that the next marble he selects will be blue?

   A .02%   C 20%

   B 2%   D 200%

18. The circumference of a circle is 36π inches. What is the radius of this circle?
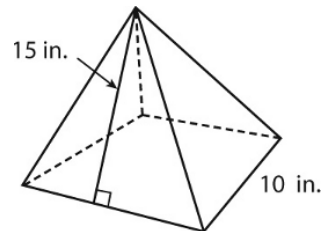
   A 9 in.   C 18 in.

   B 12 in.   D 36 in.

19. Which equation is represented by the graph below?
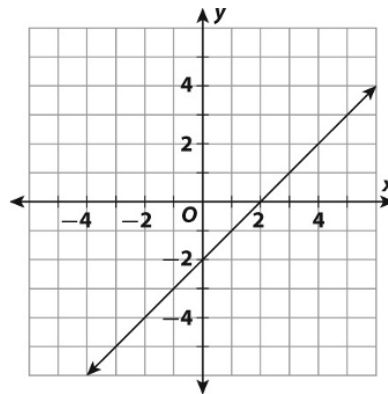
   A $y + 2 = x$

   B $y + 1 = x$

   C $y - 1 = x$

   D $y - 2 = x$

20. To the nearest square inch, what is the surface area of the square pyramid below?

   A 175 in^2 C 400 in^2

   B 200 in^2 D 700 in^2

21. Cybil flips a coin and rolls a fair number cube at the same time. What is the probability that she will toss tails and roll a number less than 3?

   A $\dfrac{1}{6}$ C $\dfrac{2}{5}$

   B $\dfrac{1}{3}$ D $\dfrac{1}{2}$

22. The Rogers family drove 220 miles in 5.5 hours. How many miles would they drive at this same rate in 4 hours?

   A 88 mi   C 160 mi

   B 147 mi   D 176 mi

Beginning-of-Year Diagnostic Test

23. Your school is choosing a new school mascot to represent all team sports. Which group should you ask to get a random sample of student opinion?

    A students on the basketball team

    B every 10th student that enters the cafeteria

    C the first 20 seniors at the library

    D students on the cheerleading squad

24. A rectangle is 14 inches long and 4 inches wide. A smaller, similar rectangle is 2 inches wide. To the nearest inch, what is the length of the smaller rectangle?

    A $3\frac{1}{2}$ in.   C 8 in.

    B 7 in.   D 28 in.

25. Inside a bag are 30 colored marbles. There are 6 yellow, 9 red, 7 white, and 8 blue. One is drawn at random. Which color is most likely to be chosen?

    A white   C blue

    B red   D yellow

26. Which table represents the same linear relationship as the equation $y = 2x + 6$?

    A
x	0	1	2	5
y	6	7	8	10

    B
x	2	3	4	5
y	8	9	10	11

    C
x	2	3	4	5
y	10	12	14	16

    D
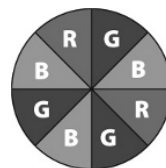 | x | 2 | 3 | 4 | 5 |
    |---|---|---|---|---|
    | y | 16 | 18 | 20 | 22 |

27. Evan's dog weighs $15\frac{3}{8}$ pounds. What is this weight written as a decimal?
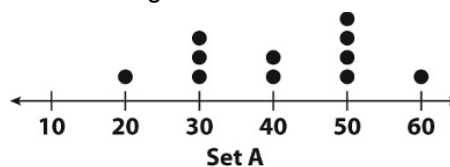
    A 15.125 lb   C 15.385 lb

    B 15.375 lb   D 15.625 lb

28. The spinner below is divided into sections that are red, green, or blue. What is the probability that the spinner will land on red or green?

    A $\frac{1}{4}$ C $\frac{1}{2}$

    B $\frac{3}{8}$ D $\frac{5}{8}$

29. Based on the dot plots below, which of the following is a true statement?


    A Set B has the greater mode.

    B Set A has more items than set B.

    C Set A is more symmetric than set B.

    D Set B has the greater range.

30. For a trip, Eli packed 3 shirts, 3 pairs of pants, and 2 pairs of shoes. How many different outfits can Eli make?

   A 6 outfits   C 9 outfits

    B 8 outfits   D 18 outfits

Beginning-of-Year Diagnostic Test

31. The net of a triangular prism is shown below. What is the surface area of the prism?
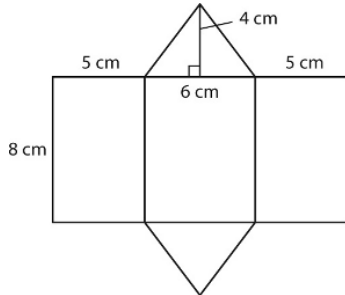
- A 128 cm²
- B 152 cm²
- C 176 cm²
- D 304 cm²

32. A middle school has 470 students. Regina surveys a random sample of 40 students and finds that 28 have cell phones. How many students at the school are likely to have cell phones?

- A 132 students
- B 188 students
- C 329 students
- D 338 students

33. Which of the following is the solution to the inequality below?

$$-5x - 10 < 20$$

- A $x > -6$
- B $x > -2$
- C $x < -6$
- D $x < -2$

34. Nina operates a dog walking service. She charges a flat fee of $15 plus $5 per hour. Which equation represents this linear relationship?

- A $y = 15x - 5$
- B $y = 15x + 3$
- C $y = 5x - 15$
- D $y = 5x + 15$

35. To the nearest tenth, what is the area of the figure below? Segment BF is a line of symmetry of the pentagon ABCDE. Use 3.14 for π.
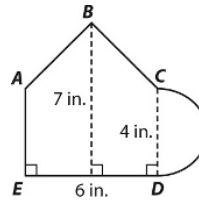
- A 30.3 in²
- B 33.0 in²
- C 39.3 in²
- D 48.3 in²

36. What is the measure of $\angle BGD$?

- A 40°
- B 50°
- C 90°
- D 130°

37. The Masim family's monthly budget is shown in the circle graph below. The family has a current monthly income of $5,000. How much money do they spend on food each month?
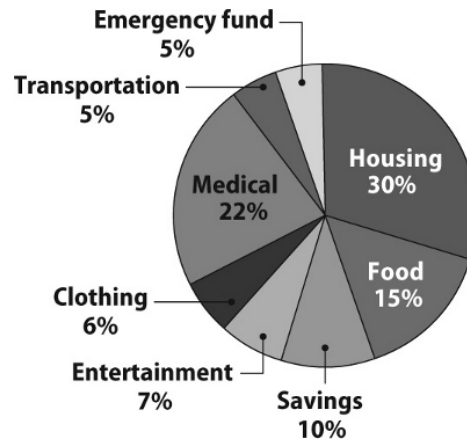
- A $250
- B $500
- C $750
- D $1,100

Beginning-of-Year Diagnostic Test

38. A box is 30 inches long wide, 16 inches long, and 14 inches high. To the nearest cubic inch, what is the volume of the box?

   A $224\ in^3$ C $480\ in^3$

   B $420\ in^3$ D $6,720\ in^3$

39. A circle has a radius of 7 inches. What is the area of the circle, rounded to the nearest whole number?

   A $21.98\ in^2$ C $153.86\ in^2$

   B $43.96\ in^2$ D $615.44\ in^2$

40. The circle graph shows the results of an employment survey of 800 people. How many of the people surveyed were unemployed?

Employment Survey
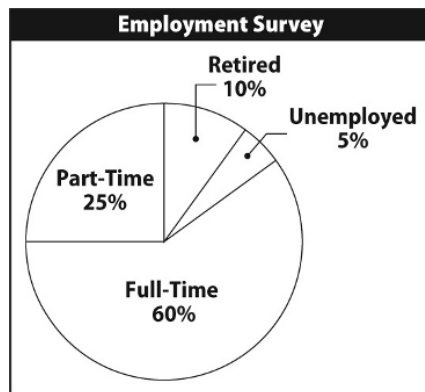
   A 20 people   C 80 people

   B 40 people   D 120 people

41. An equestrian center is surveying riders to determine which type of horse is preferred. Which of the following is a random sampling method?

   A The equestrian center manager surveys the first 50 riders.

   B The equestrian center surveys every tenth rider at the stable.

   C The equestrian center manager surveys 50 of his friends.

   D The equestrian center surveys the 50 best riders.

42. A 16-inch piece of string is 40.64 centimeters long. To the nearest 0.01 a centimeter, how long will a 42-inch piece of ribbon be?

   A 56.64 cm

   B 82.64 cm

   C 106.68 cm

   D 1,706.88 cm

43. One circle has a diameter of 6 inches. A second, larger circle has a diameter that is four times the diameter of the first circle. What is the ratio of the area of the smaller circle to the larger circle?

   A 2:3   C 1:16

   B 1:6.4   D 1:64

Use the box plot for 44–45.

Survey of Ages of Participants

5 15 25 35 45 55 65 75 85
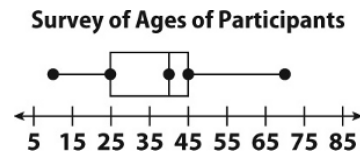
44. What is the median?

   A 10   C 40

   B 25   D 45

45. What is the interquartile range?

   A 10   C 40

   B 20   D 45

Use the figure for 46–47.
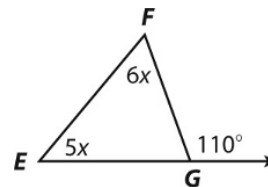
46. What is the measure of ∠FEG?

   A 30°   C 50°

   B 40°   D 70°

Beginning-of-Year Diagnostic Test

47. Which of the following is **not** true?

    A $5x + 6x = 70°$

    B $5x + 6x < 180°$

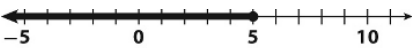   C $5x + 6x = 110°$

    D $5x + 6x + 70° = 180°$
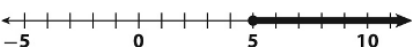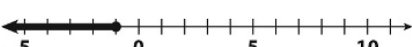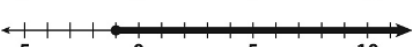
48. Which equation represents the data shown in the table below?

Cost (y)	5	9	13	17
Gallon (x)	2	4	6	8

    A $y = 2x + 1$ C $y = 2.5x$

    B $y = 3x - 1$ D $y = 2.5x + 1$

49. Which number line represents the solution to the inequality below?

    $$x - 2 \geq 3$$

    A

    B

    C

    D

50. Three stores have the same tablet computer on sale. The regular price of the tablet is $150. Store A is offering the tablet on sale at 15% off the regular price. Store B is offering a $25 coupon to be deducted from the regular price. Store C is offering a rebate of $20.00 to purchasers. Store D has the tablet on sale for $120.00. Which store is offering the tablet at the lowest cost?

    A Store A

    B Store B

    C Store C

    D Store D

51. The circumference of a circle is 12π feet. What is the radius of the circle?

    A 3 ft   C 12 ft

    B 6 ft   D 24 ft

52. The Demir family has a monthly budget of $5,500. Mrs. Demir works fulltime and takes home $4,000 each month. Mr. Demir works part-time and brings home earns $16 per hour. How many hours per month must Mr. Demir work at his part-time job to make sure that he and Mrs. Demir have met their monthly budget?

    A 37.5 h   C 93.75 h

    B 75 h   D 125 h

53. Chana has a bag of colored tiles. Without looking, she removes one tile, records the color, and replaces it. She repeats this process 40 times and records the results in the table.

Color	Frequency
Red	9
Blue	12
Green	14
Yellow	5

    What is the probability that Chana will not pick a yellow tile on her forty-first time?

    A $\dfrac{1}{8}$ C $\dfrac{7}{8}$

    B $\dfrac{1}{4}$ D $\dfrac{9}{10}$

54. Mills Middle School has 280 students. A random sample of 30 students were asked how many cars their families have at home. The results are shown in the dot plot below.
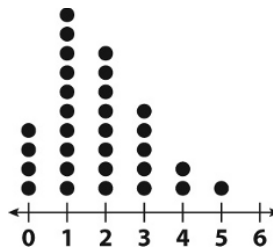
Beginning-of-Year Diagnostic Test

Which of the following is a qualitative statement that is reasonable based on the data?

A The fewest number of cars at home is 0.

B Most students have 2 or fewer cars at home.

C Most students have 3 or more cars at home.

D The median number of cars at home is 3.

55. Aaron buys 3 ties for $19.95 each, a belt for $23.50, and a pair of boots for $124.95. The sales tax in his city is 5%, To the nearest cent, what is the total cost of Aaron's purchases?

A $172.82   C $218.72

B $197.77   D $304.29

56. The probability of spinning an odd number on a spinner is 62 percent. What is the probability of **not** spinning an odd number?

A 0.28   C 0.48

B 0.38   D 0.62

57. The dot plots below show the number of hours per week that some sixth graders and eight graders play video games. What is the difference between the mode for sixth graders and the mode for eight graders?
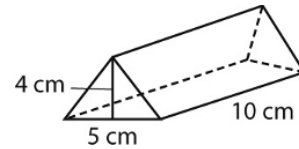

6th Graders

8th Graders

A 3 h   C 8 h
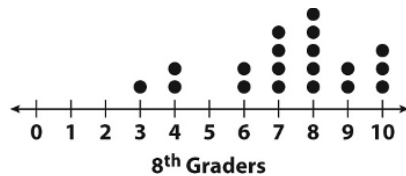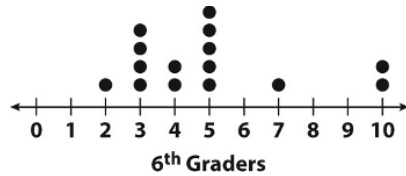
B 5 h   D 13 h

58. A baseball player gets a hit 20% of the times he is at bat. Out of the next 15 times at bat, how many hits can you expect the player to get?

A 2 hits   C 5 hits

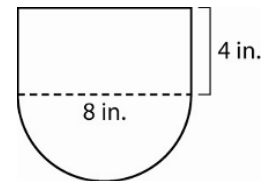B 3 hits   D 12 hits

59. What is the volume of the prism below?

4 cm   10 cm   5 cm

A 100 cm^3 C 150 cm^3

B 125 cm^3 D 200 cm^3

60. What is the value of x in the equation below?

$$5x - 35 = 40$$

A −1   C −15

B 1   D 15

61. To the nearest hundredth, what is the area of the figure below? Use 3.14 for π.


4 in.

8 in.

A 57.12 in^2 C 200.96 in^2

B 128 in^2 D 328.96 in^2

62. Mike has $75 to spend at a local model car show. The entrance price for the show is $20. At one seller's stand, Mike finds some model cars that he likes that are $7.50 each. What is the maximum number of model cars that Mike can buy at that stand?

A 6 cars   C 8 cars

B 7 cars   D 10 cars

Beginning-of-Year Diagnostic Test

63. A 7-by-7 foot rug is shown below. A coin is tossed onto the rug randomly. What is the probability that the coin will land on an area that is white?
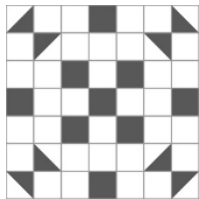
    A 26.53%   C 73.47%

    B 36.11%   D 276.92%

64. On a road map, the distance from Greenmount to Yorktowne is 2 inches. The map scale is 1 in.:25 mi. How many miles is the actual distance between the two cities?

    A 12.5 mi   C 50 mi

    B 25 mi   D 125 mi

65. The temperature in Jukkasjarvi, Sweden, was −3° at 3 P.M. After 6 hours, the temperature dropped to −15°. The temperature dropped the same amount each hour. What was the change in temperature each hour?

    A −2°   C 3°

    B −5°   D 12°

66. The two quadrilaterals below are similar. What is the length of $\overline{EF}$?
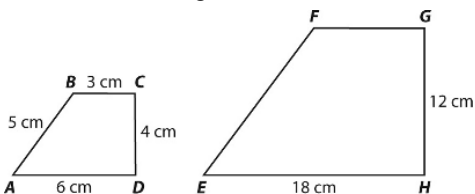
    A 9 cm   C 17 cm

    B 15 cm   D 22 cm

67. The Canadian $2 coin has a diameter of 28 millimeters. To the nearest 0.01 mm, what is the circumference of this coin?

   A 87.92 mm   C 615.44 mm

    B 175.84 mm   D 2,461.76 mm

68. Rinaldo is buying a new truck for $36,000. He is entitled to an 8% rebate. How much will the truck cost after the rebate?

    A $22,800   C $33,120

    B $29,520   D $35,999

69. A bike rental company charges a $10 fee plus $5 per hour. Sofia has $25 to spend. Which inequality could you use to find x, the number of hours Sofia could rent a bike?

    A $10x + 5 > 25$ C $10x + 5 \geq 25$

    B $5x + 10 < 25$ D $5x + 10 \leq 25$

70. To the nearest square meter, what is the area of the figure below?
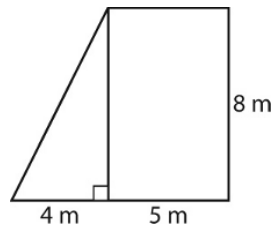
    A 32 m²   C 56 m²

    B 40 m²   D 72 m²

71. The Dead Sea is at an elevation of −1,360 feet. A seabird is flying over the Dead Sea at an elevation of −422 feet. If the bird lands on the Dead Sea, what will be its change in elevation?

    A −1,782 ft   C 938 ft

    B −938 ft   D 1,782 ft

72. On a scale drawing, the image of an alligator is 7 inches long. The scale factor is $\dfrac{1}{25}$. What is the actual length of the alligator in inches?

    A 28 in.   C 175 in.

    B 35.7 in.   D 280 in.

Beginning-of-Year Diagnostic Test

73. Norfolk Island near Australia has an area of 36 square kilometers. The area of Bermuda is 1.8 times that of Norfolk Island. To the nearest tenth, what is the area of Bermuda?

   A 4.5 km^2 C 64.8 km^2

   B 6.5 km^2 D 648 km^2

74. Becky earned $21,280.08 last year. She earned the same amount each month. To the nearest penny, how much did she earn per month last year?

   A $177.33   C $2,103.34

   B $1,773.34   D $2,883.39

75. Omar spins both the spinners below. What is the probability that he will land on red and a number less than 5?
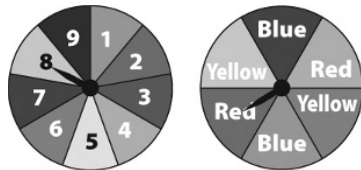
   A $\dfrac{1}{64}$ C $\dfrac{4}{27}$

   B $\dfrac{3}{32}$ D $\dfrac{5}{27}$

76. Each hour, the temperature rose by $1\dfrac{1}{2}$ degrees. What was the change in temperature in $1\dfrac{1}{2}$ hours?

   A $1\dfrac{1}{4}$ degrees   C $2\dfrac{3}{4}$ degrees

   B $2\dfrac{1}{4}$ degrees   D 3 degrees

77. One triangle has sides that measure 8 yards, 15 yards, and 17 yards. The side lengths of a second triangle are 48 yards, 90 yards, and 102 yards. What is the constant of proportionality between the second and first triangle?

   A $\dfrac{1}{11}$ C 6

   B $\dfrac{1}{6}$ D 11

78. A supermarket is having a sale on canned foods. The sale includes 10 cans of beans for $12.50. What is the unit price per can of beans?

   A $0.80   C $1.75

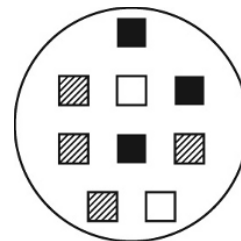   B $1.25   D $2.25

79. Beth says the graph below shows last year's temperatures in degrees Celsius.
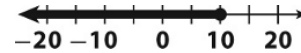
   Which of these could **not** have been one of last year's temperatures?

   A −11.3°C   C 7.6°C

   B −0.9°C   D 10.3°C

80. A larger circle contains white, striped, and black squares in the same ratio as those shown in the circle below. If the larger circle contains 162 squares, how many of them are black?

   A 36 squares   C 72 squares

   B 54 squares   D 126 squares

Beginning-of-Year Diagnostic Test

81. A rectangular prism is 5 meters long, 2 meters wide, and 2 meters high. What is the surface area of this prism in square inches?
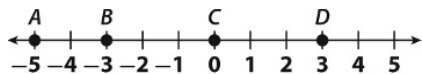
    A 20 m²   C 52 m²

    B 48 m²   D 100 m²

82. Simplify the expression below.

$$-3\left(\frac{1}{6}\right)(2) \div \frac{1}{4}$$

    A −2   C 1

    B −4   D 3

83. Four students put their game scores on the number line below. What is the combined score of students B and D?

    A −3   C 1

    B 0   D 3

84. Ava wants to leave a 20% tip for the server at a restaurant. Which expression represents the total amount Ava should pay, if *m* is the price of the meal?

    A 2*m*   C *m* + 0.2*m*

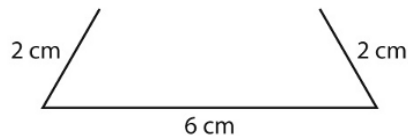   B 0.2*m*   D *m* + 20*m*

85. A rectangular prism is sliced by a horizontal plane. What is the shape of the cross-section?

    A triangle   C rectangle

    B circle   D trapezoid

86. What is the probability of flipping two coins and both landing tails?

    A 0.25   C 2.5

    B 1.5   D 4

87. Which statement is true about the line segments below?

    A They can form a unique triangle.

    B They can form more than one triangle.

    C They cannot form a triangle.

    D It cannot be determined whether they can form a triangle.

88. At a school carnival you pick a ball from two different containers. Each container has red balls and green balls. How many possible outcomes are there?

    A 2   C 6

    B 4   D 8

89. The theoretical probability of a customer walking into Andy's deli and purchasing a sandwich is 6 in 10. Which of the following predictions about Andy's deli is most likely true?

    A The next 6 customers will purchase a sandwich.

    B The next 10 customers will purchase a sandwich.

    C 6 out of the next 100 customers will purchase a sandwich.

    D 12 out of the next 20 customers will purchase a sandwich.

90. Simplify the expression below.

$$2x - 3(y - 2x)$$

    A 8*x* − 3*y*   C −4*x* − 3*y*

    B − 3*y*   D 2*x* − 3*y*