

22. Sets A , B , and C are defined below.

$$A = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$$

$$B = \{2, 4, 6, 8\}$$

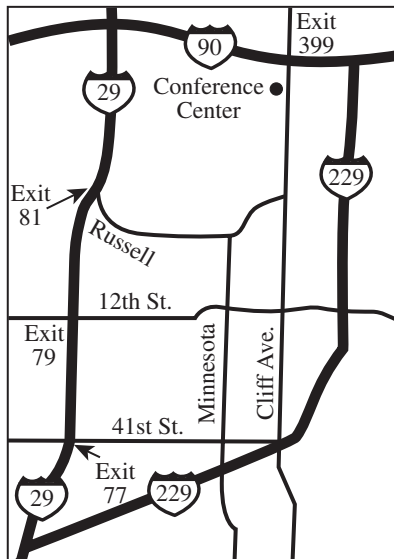
$$C = \{4, 8\}$$

A number will be randomly selected from A . What is the probability that the selected number will be an element of C and an element of B ?

- F. $\frac{1}{9}$
- G. $\frac{2}{9}$
- H. $\frac{4}{9}$
- J. $\frac{6}{9}$
- K. 1

DO YOUR FIGURING HERE.

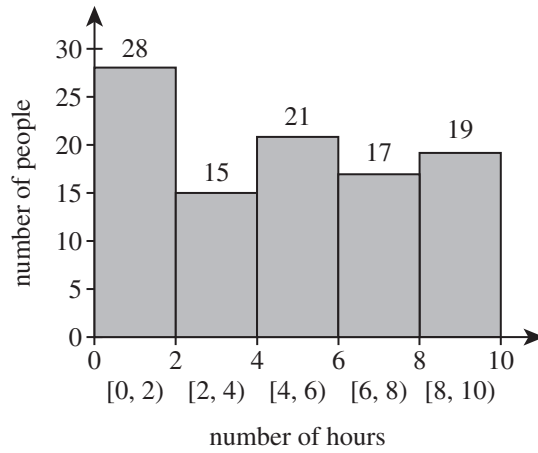
23. Maranda is going to a leadership conference and was given the map below to guide her to the Conference Center. The map has no scale, but she knows that the distance between Exits 77 and 79 on Interstate 29 is 2 miles. On the map, this distance is $\frac{3}{4}$ of an inch. She plans to exit Interstate 29 at Exit 77, travel on 41st Street to Cliff Avenue, and then proceed on Cliff Avenue to the Conference Center. The distance on the map from Exit 77 to the Conference Center over this route is $3\frac{3}{8}$ inches. What is this distance, in miles?



- A. 4
- B. 5
- C. 9
- D. 12
- E. 18



24. The histogram below shows the results of a survey of 100 people. Each person identified the number of hours per week that they watch TV. How many people surveyed watch TV at least 4 hours per week?



- F. 57
G. 38
H. 28
J. 21
K. 19
25. Each side of a square is 4 cm long. One vertex of the square is at (6,2) on a square coordinate grid marked in centimeter units. Which of the following points on the grid could be another vertex of the square?
- A. (10, 2)
B. (7, 3)
C. (2, 5)
D. (1,-5)
E. (-4, 2)
26. An outlier is added to the data set below. Which of the following pairs of statistics has no change in value as a result of the addition of the outlier?
- {60, 63, 66, 70, 72, 72, 73, 73, 73, 75}
- F. Mean and median
G. Mean and mode
H. Mean and range
J. Median and mode
K. Median and range
27. Given that $\angle R$ is the included angle between the 2 congruent sides of the isosceles triangle $\triangle RST$, and the measure of $\angle R$ is 50° , what is the measure of $\angle S$?
- A. 20°
B. 50°
C. 65°
D. 80°
E. 130°

DO YOUR FIGURING HERE.



28. In the standard (x,y) coordinate plane, what is the distance, in coordinate units, from $A\left(5\frac{1}{3}, -3\right)$ to $B\left(-1\frac{5}{9}, -3\right)$?

- F. $\frac{8}{9}$
 G. $2\frac{2}{9}$
 H. $3\frac{7}{9}$
 J. $6\frac{8}{9}$
 K. $12\frac{8}{9}$

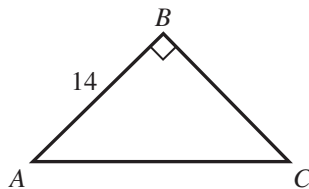
DO YOUR FIGURING HERE.

29. Hikers' World Foods sells raisin-nut mix in bulk to stores. The dollar amount *per pound*, $P(x)$, for a store to purchase x pounds of raisin-nut mix from Hikers' World is given by the function below.

$$P(x) = 3.50 + 0.90^x$$

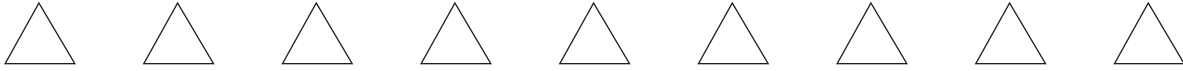
To the nearest \$0.01, which of the following dollar values is equal to the total price for a store to purchase 100 pounds of raisin-nut mix in a single order from Hikers' World?

- A. \$350.00
 B. \$359.00
 C. \$440.00
 D. \$616.00
 E. \$903.50
30. In right triangle $\triangle ABC$ shown below, $\sin C = \frac{5}{7}$ and the length of \overline{AB} is 14 inches. What is the length, in inches, of \overline{AC} ?



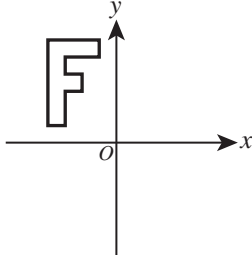
- F. $\sqrt{24}$
 G. $\sqrt{74}$
 H. 10
 J. 19.6
 K. 24
31. The 1st term of a geometric sequence is 27, and the 4th term is 64. In terms of n , what is the n th term of the sequence?

- A. $27\left(\frac{3}{4}\right)^{n-1}$
 B. $27\left(\frac{3}{4}\right)^n$
 C. $27\left(\frac{4}{3}\right)^{n-1}$
 D. $27\left(\frac{4}{3}\right)^n$
 E. $27\left(\frac{4}{3}\right)n$



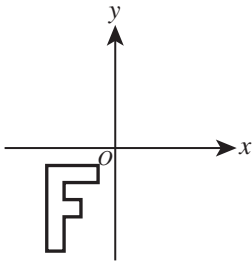
32. A series of transformations are applied to the graph in the standard (x,y) coordinate plane below. The graph below is reflected across the x -axis. The new graph is reflected across the y -axis. This new graph is rotated 90° clockwise (\odot) about the origin.

DO YOUR FIGURING HERE.

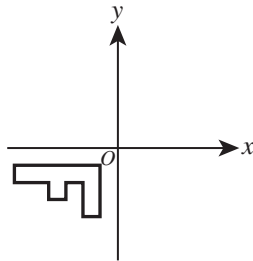


The resulting graph is one of the following graphs. Which one?

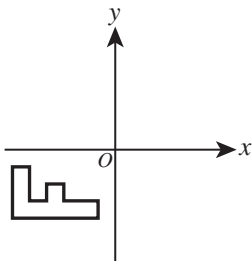
F.



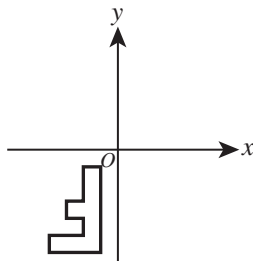
J.



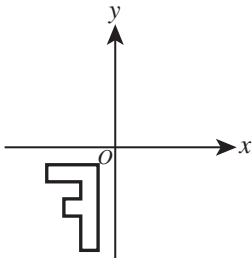
G.



K.



H.



33. What is the least positive number that has a remainder of 3 when divided by 6 and a remainder of 6 when divided by 9 ?

- A. 15
- B. 18
- C. 24
- D. 42
- E. 72



34. What rational number is exactly halfway between $\frac{2}{8}$ and $\frac{6}{14}$ on the real number line?

F. $\frac{2}{11}$
G. $\frac{19}{14}$
H. $\frac{19}{28}$
J. $\frac{5}{56}$
K. $\frac{19}{56}$

DO YOUR FIGURING HERE.

35. On a certain day in Katie's yard, the average rate of change in temperature per hour between 1 p.m. and 11 p.m. was -2°F per hour. The temperature in Katie's yard at 11 p.m. that day was 42°F . Which of the following was the temperature in Katie's yard at 1 p.m. that day?

A. 14°F
B. 22°F
C. 62°F
D. 64°F
E. 84°F

36. Given that i is the imaginary unit, which of the following complex numbers is equal to $(7 + 6i)^2$?

F. 13
G. 85
H. $13 + 84i$
J. $14 + 12i$
K. $85 + 84i$

37. Two motorcycles, starting at the same point at the same time, travel away from each other at a 90° angle. One travels at 40 miles per hour and the other at 60 miles per hour. If they continue traveling at these constant rates, after about how many hours will they be 200 miles apart?

A. 1.4
B. 2.8
C. 3.2
D. 7.7
E. 8.7



Use the following information to answer questions 38–40.

DO YOUR FIGURING HERE.

A website about birds made the 4 claims below about American robins.

1. The population of American robins in 2015 was 320 million.
2. The wingspans of all American robins can be fit to a normal distribution model that has a mean of 36.00 cm and a standard deviation of 2.50 cm.
3. The maximum reported flight speed for an American robin is 3,168 feet per minute.
4. A certain conservation organization will only consider American robins *threatened* if the total number of American robins declines by at least 30% over a 10-year period.

38. Suppose the population of American robins increased each year from 2005 to 2015. The conservation organization will consider American robins threatened provided that their population in 2025 is no greater than what number?

- F. 960,000
- G. 9,600,000
- H. 22,400,000
- J. 96,000,000
- K. 224,000,000

39. The population of American robins in 2015 is equal to 3.2×10^k for some integer k . What is the value of k ?

- A. -8
- B. -7
- C. 2
- D. 7
- E. 8

40. A certain robin flew for 15 seconds at the maximum reported flight speed cited by the website. Which of the following values is closest to the number of *meters* the robin flew during that time?

(Note: 1 meter \approx 3.3 feet)

- F. 64
- G. 240
- H. 697
- J. 792
- K. 960