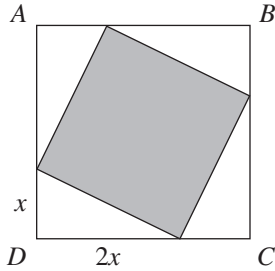
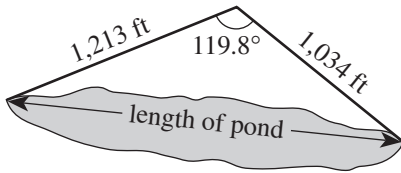


33. In the figure below, $ABCD$ is a square. Points are chosen on each pair of adjacent sides of $ABCD$ to form 4 congruent right triangles, as shown below. Each of these has one leg that is twice as long as the other leg. What fraction of the area of square $ABCD$ is shaded?



- A. $\frac{1}{9}$
- B. $\frac{2}{9}$
- C. $\frac{4}{9}$
- D. $\frac{5}{9}$
- E. $\frac{8}{9}$

34. A surveyor took and recorded the measurements shown in the figure below. If the surveyor wants to use these 3 measurements to calculate the length of the pond, which of the following would be the most directly applicable?



- F. The Pythagorean theorem
- G. A formula for the area of a triangle
- H. The ratios for the side lengths of 30° - 60° - 90° triangles
- J. The ratios for the side lengths of 45° - 45° - 90° triangles
- K. The law of cosines: For any $\triangle ABC$, where a is the length of the side opposite $\angle A$, b is the length of the side opposite $\angle B$, and c is the length of the side opposite $\angle C$, $a^2 = b^2 + c^2 - 2bc \cos(\angle A)$

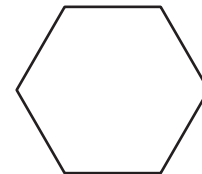
35. Which of the following is the graph of the equation $2x + y = 4$ in the standard (x,y) coordinate plane?

- A.
- B.
- C.
- D.
- E.

36. Which of the following figures in a plane separates it into half-planes?

- F. A line
- G. A ray
- H. An angle
- J. A point
- K. A line segment

37. What is the maximum number of distinct diagonals that can be drawn in the hexagon shown below?

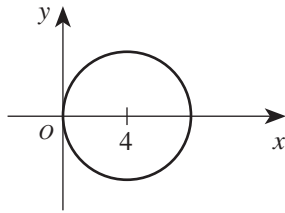


- A. 4
- B. 5
- C. 6
- D. 9
- E. 12



38. In the standard (x,y) coordinate plane, the center of the circle shown below lies on the x -axis at $x = 4$. If the circle is tangent to the y -axis, which of the following is an equation of the circle?

- F. $(x + 4)^2 + y^2 = 4$
 G. $(x - 4)^2 + y^2 = 16$
 H. $(x - 4)^2 - y^2 = 16$
 J. $(x - 4)^2 + y^2 = 4$
 K. $x^2 + (y - 4)^2 = 16$

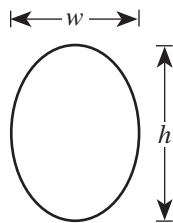


39. In what order should $\frac{5}{3}$, $\frac{7}{4}$, $\frac{6}{5}$, and $\frac{9}{8}$ be listed to be arranged by increasing size?

- A. $\frac{9}{8} < \frac{6}{5} < \frac{5}{3} < \frac{7}{4}$
 B. $\frac{9}{8} < \frac{6}{5} < \frac{7}{4} < \frac{5}{3}$
 C. $\frac{7}{4} < \frac{5}{3} < \frac{9}{8} < \frac{6}{5}$
 D. $\frac{6}{5} < \frac{9}{8} < \frac{5}{3} < \frac{7}{4}$
 E. $\frac{5}{3} < \frac{6}{5} < \frac{7}{4} < \frac{9}{8}$

40. Mai is putting gold foil around the outside of an elliptical picture frame. The perimeter of an ellipse is given by the formula $p = \frac{\pi}{2} \sqrt{2(h^2 + w^2)}$, where h is the height and w is the width, as shown in the diagram below. If an elliptical frame has an outside height equal to 4 inches and an outside width equal to 3 inches, what is its outside perimeter, in inches?

- F. $\frac{5}{2} \pi \sqrt{2}$
 G. $\frac{7}{2} \pi \sqrt{2}$
 H. $5\pi \sqrt{2}$
 J. $\frac{\pi}{2} (4\sqrt{2} + 3)$
 K. $(4\pi + 3)\sqrt{2}$



41. If $\frac{A}{30} + \frac{B}{105} = \frac{7A+2B}{x}$ and A , B , and x are integers greater than 1, then what must x equal?

- A. 9
 B. 135
 C. 210
 D. 630
 E. 3,150

Use the following information to answer questions 42–44.

Kaylee is planning to purchase a car. She will need to borrow some of the money and has a chart, shown below, to use to approximate her monthly payment. The chart gives the approximate monthly payment per \$1,000 borrowed.

Monthly payment per \$1,000 borrowed for various annual rates and various numbers of payments			
Annual interest rate	Number of monthly payments		
	36	48	60
5%	\$29.97	\$23.03	\$18.87
8%	\$31.34	\$24.41	\$20.28
10%	\$32.27	\$25.36	\$21.24
12%	\$33.22	\$26.34	\$22.24

42. Kaylee found a used car she is thinking about purchasing. The list price is \$8,795. She calculates that she will need to borrow \$6,500. Approximately what would her monthly payment be if she borrowed the money for 36 months at an annual interest rate of 10%?

- F. \$164.84
 G. \$171.21
 H. \$209.76
 J. \$234.72
 K. \$283.81

43. A local dealership is having an end-of-the-model-year clearance sale and is offering 5% annual interest on new-car loans for 36, 48, or 60 months. The maximum amount Kaylee can budget for her monthly car payment is \$300. Of the following loan amounts, which one is the maximum Kaylee can borrow at 5% annual interest and stay within her budget?

- A. \$10,000
 B. \$13,000
 C. \$14,000
 D. \$15,000
 E. \$20,000

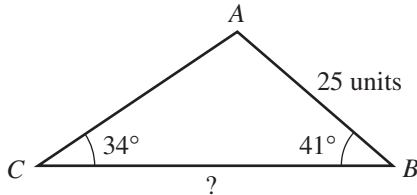
44. Another dealership is offering 5-year loans with a 9% annual interest rate. Kaylee uses her chart to estimate the payment per \$1,000 borrowed. Of the following, which is most likely the monthly payment per \$1,000 borrowed?

- F. \$20.52
 G. \$20.76
 H. \$20.85
 J. \$21.00
 K. \$21.74



45. In $\triangle ABC$, shown below, the measure of $\angle B$ is 41° , the measure of $\angle C$ is 34° , and \overline{AB} is 25 units long. Which of the following is an expression for the length, in units, of \overline{BC} ?

(Note: The law of sines states that, for any triangle, the ratios of the sines of the interior angles to the lengths of the sides opposite those angles are equal.)

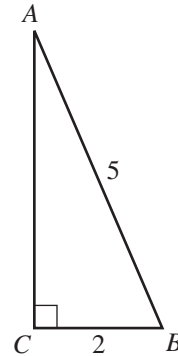


- A. $\frac{25 \sin 105^\circ}{\sin 41^\circ}$
 B. $\frac{25 \sin 105^\circ}{\sin 34^\circ}$
 C. $\frac{25 \sin 75^\circ}{\sin 41^\circ}$
 D. $\frac{25 \sin 41^\circ}{\sin 105^\circ}$
 E. $\frac{25 \sin 34^\circ}{\sin 75^\circ}$
46. For $i^2 = -1$, $(4 + i)^2 = ?$
 F. 15
 G. 17
 H. $15 + 4i$
 J. $15 + 8i$
 K. $16 + 4i$
47. If r and s can be any integers such that $s > 10$ and $2r + s = 15$, which of the following is the solution set for r ?
 A. $r \geq 3$
 B. $r \geq 0$
 C. $r \geq 2$
 D. $r \leq 0$
 E. $r \leq 2$
48. Which of the following expressions has a positive value for all x and y such that $x > 0$ and $y < 0$?
 F. $y - x$
 G. $x + y$
 H. x^3y
 J. $\frac{x^2}{y}$
 K. $\frac{x}{y^2}$

49. What is the value of $\log_2 8$?

- A. 3
 B. 4
 C. 6
 D. 10
 E. 16

50. In the right triangle below, the measure of $\angle C$ is 90° , $AB = 5$ units, and $CB = 2$ units. What is $\tan B$?

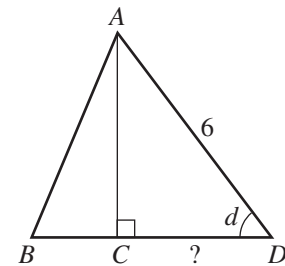


- F. $\frac{\sqrt{21}}{2}$
 G. $\frac{3}{2}$
 H. $\frac{\sqrt{21}}{5}$
 J. $\frac{3}{5}$
 K. $\frac{2}{5}$

51. A flight instructor charges \$50 per lesson, plus an additional fee for the use of his plane. The charge for the use of the plane varies directly with the square root of the time the plane is used. If a lesson plus 16 minutes of plane usage costs \$90, what is the total amount charged for a lesson having 36 minutes of plane usage?

- A. \$185
 B. \$150
 C. \$135
 D. \$110
 E. \$ 60

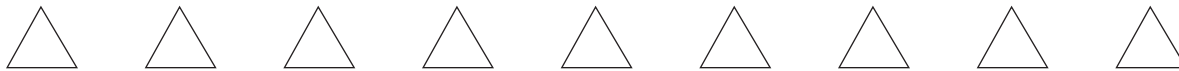
52. In $\triangle ABD$, shown below, C is on \overline{BD} , the length of \overline{AD} is 6 inches, and $\sin d = 0.8$. How many inches long is \overline{CD} ?



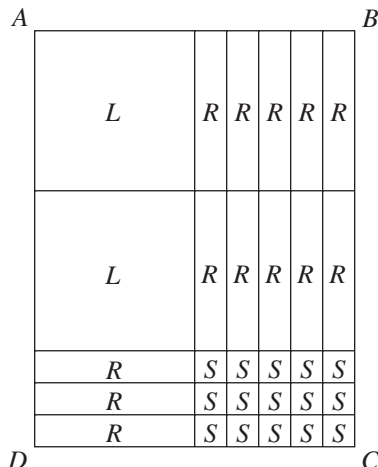
- F. 1.2
 G. 1.8
 H. 3.6
 J. 4.8
 K. Cannot be determined from the given information

53. For real numbers a and b , when is the equation $|a + b| = |a - b|$ true?

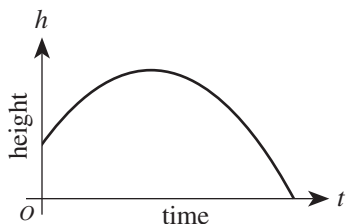
- A. Always
 B. Only when $a = b$
 C. Only when $a = 0$ and $b = 0$
 D. Only when $a = 0$ or $b = 0$
 E. Never



54. As shown below, rectangle $ABCD$ is divided into 2 large squares (labeled L) each x inches on a side, 15 small squares (labeled S) each y inches on a side, and 13 rectangles (labeled R) each x inches by y inches. What is the total area, in square inches, of $ABCD$?



- F. $2x^2 + 13xy + 15y^2$
 G. $6x^2 + 16y^2$
 H. $2x^2 + 15y^2$
 J. $2x^2 + 8xy + 15y^2$
 K. $2x^2 + 13xy + 15y^2$
55. For some real number A , the graph of the line $y = (A + 1)x + 8$ in the standard (x,y) coordinate plane passes through $(2,6)$. What is the slope of this line?
- A. -4
 B. -3
 C. -1
 D. 3
 E. 7
56. The graph of the equation $h = -at^2 + bt + c$, which describes how the height, h , of a hit baseball changes over time, t , is shown below.

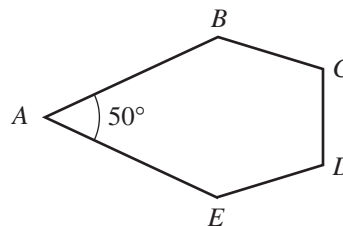


If you alter only this equation's c term, which gives the height at time $t = 0$, the alteration has an effect on which of the following?

- I. The h -intercept
 II. The maximum value of h
 III. The t -intercept
- F. I only
 G. II only
 H. III only
 J. I and III only
 K. I, II, and III

57. When graphed in the standard (x,y) coordinate plane, the lines $x = -3$ and $y = x - 3$ intersect at what point?
- A. $(0, 0)$
 B. $(0, -3)$
 C. $(-3, 0)$
 D. $(-3, -3)$
 E. $(-3, -6)$

58. In pentagon $ABCDE$, shown below, $\angle A$ measures 50° . What is the total measure of the other 4 interior angles?



- F. 130°
 G. 200°
 H. 310°
 J. 432°
 K. 490°
59. For all real numbers b and c such that the product of c and 3 is b , which of the following expressions represents the sum of c and 3 in terms of b ?
- A. $b + 3$
 B. $3b + 3$
 C. $3(b + 3)$
 D. $\frac{b+3}{3}$
 E. $\frac{b}{3} + 3$
60. Which of the following expresses the number of meters a contestant must travel in a 3-lap race where the course is a circle of radius R meters?
- F. $3R$
 G. $3\pi R$
 H. $3\pi R^2$
 J. $6R$
 K. $6\pi R$

END OF TEST 2

STOP! DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.

DO NOT RETURN TO THE PREVIOUS TEST.