

MATHEMATICS TEST ONE

60 Minutes—60 Questions

DIRECTIONS: Solve each problem, choose the correct answer, and circle the letter corresponding to the correct answer. You are permitted to use a calculator on this test. You may use your calculator for any problems you choose, but some of the problems may best be done without using a calculator.

Note: Unless otherwise stated, all of the following should be assumed:

1. Illustrative figures are NOT necessarily drawn to scale.
2. Geometric figures lie in a plane.
3. The word line indicates a straight line.
4. The word average indicates arithmetic mean.

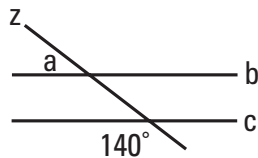
DO YOUR FIGURING HERE.

1. $3x - 4 = 14$?

- A. 18
- B. 10
- C. $8 \frac{2}{3}$
- D. 6
- E. $3 \frac{1}{3}$

2. In the figure below, line b is parallel to line c. One angle with line z has a measure of 140° , as shown. What is the degree measure of angle a?

- F. 40°
- G. 45°
- H. 55°
- J. 75°
- K. 140°



3. During the first 5 games of the season, a baseball team scored the following point totals: 2, 3, 7, 4, and 4. What is the average score of the baseball team?

- A. 7
- B. 6
- C. 5
- D. 4
- E. 3

4. If $a=2$, $b=3$, and $c=8$, what is the value of $ab^2 + \frac{3c}{a} - b^3$?

- F. 3.0
- G. 12.0
- H. 16.5
- J. 18.0
- K. 27.0

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5. Ann drove for 6 hours and 30 minutes at 60 miles per hour. How far did Ann drive, in miles?
- A. 390
 - B. 378
 - C. 360
 - D. 65
 - E. 60
6. For all real numbers m and n ,
 $3m - 6n - 2(m - 3n) = ?$
- F. n
 - G. $m - 12n$
 - H. $m - 9n$
 - J. m
 - K. $-m + 12n$
7. Charles is planning to carpet 2 rectangular rooms in his house. The first room measures 10 feet by 12 feet, and the second room measures 15 feet by 13 feet. How many square feet of carpet will Charles need to cover the two rooms?
- A. 315
 - B. 290
 - C. 265
 - D. 195
 - E. 120
8. What value of c in the equation
 $2x + c - 6 = 4x - c$ causes the solution for x to be 3?
- F. 2
 - G. 3
 - H. 4
 - J. 5
 - K. 6
9. For all x , $(4x + 7)(3x - 2) = ?$
- A. $12x^2 - 14$
 - B. $12x^2 + 21x + 14$
 - C. $12x^2 + 13x - 14$
 - D. $12x^2 - 8x - 14$
 - E. $7x^2 + 13x - 14$

DO YOUR FIGURING HERE.

10. A gardener picked 16 of 40 roses that she grew in her greenhouse. What fraction of the 40 roses did she pick?

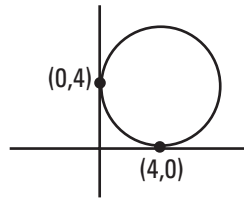
- F. $1/4$
- G. $2/5$
- H. $3/5$
- J. $2/3$
- K. $3/2$

11. A certain red sweater costs \$55 and a certain blue sweater costs \$80. If the cost of the red sweater increases by 5% and the cost of the blue sweater decreases by 10%, what will be the sum of their costs?

- A. \$140.25
- B. \$132.75
- C. \$130.00
- D. \$129.75
- E. \$127.00

12. Which of the following is an equation of the circle in the standard (x, y) coordinate plane below?

- F. $(x + 4)^2 + (y + 4)^2 = 16$
- G. $(x - 4)^2 + (y - 4)^2 = 16$
- H. $(x + 4)^2 + (y + 4)^2 = 4$
- J. $(x - 4)^2 + (y - 4)^2 = 4$
- K. $(x + 4)^2 + (y - 4)^2 = 8$



13. The figure below shows a circle inscribed in a 8 unit by 8 unit square. What is the area of the circle, in square units?

- A. 64π
- B. 24π
- C. 16π
- D. 12π
- E. 8π



14. What is the y-intercept of the line determined by the equation $3x + 4y = 12$?

- F. -3
- G. $-3/4$
- H. $3/4$
- J. 3
- K. 4

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15. What is the smallest positive integer that is divisible by 3, is divisible by 4, and is divisible by 5 (with no remainders)?
- A. 12
 - B. 15
 - C. 20
 - D. 60
 - E. 120
16. $10^6 (10^2) / 10^{-3} = ?$
- F. 10^{-15}
 - G. 10
 - H. 10^4
 - J. 10^5
 - K. 10^{11}
17. If $0.05y + 4.5 = y - 3.1$, then $y = ?$
- A. 4
 - B. 6
 - C. 8
 - D. 10
 - E. 12
18. The cost of water at a local utility company is 22 cents per gallon for the first one hundred gallons used in a month and 20 cents per gallon for each additional gallon used. What is the cost of 300 gallons of water used in 1 month?
- F. \$126.00
 - G. \$75.00
 - H. \$66.00
 - J. \$62.00
 - K. \$60.00
19. A CD that you want to buy costs \$14.99. A sales tax of 8% of the \$14.99 will be added (rounded to the nearest cent). You have a ten-dollar bill, a five-dollar bill, and five one-dollar bills. How much will you need in coins if you want to have exact change ready when you pay?
- A. 8 cents
 - B. 15 cents
 - C. 19 cents
 - D. 40 cents
 - E. 65 cents

DO YOUR FIGURING HERE.

20. Which of the following is the solution statement for the inequality

$$6 - 3(x-2) \geq 2x + 2?$$

- F. $x \leq -2$
- G. $x \geq 0$
- H. $x \leq 0$
- J. $x \geq 2$
- K. $x \leq 2$

21. Which of the following is an irrational number?

- A. 0.2
- B. $|-3/8|$
- C. $6/11$
- D. $\sqrt{3}$
- E. 2.7

22. How many inches in length is the circumference of a circle with a diameter of 10 units?

- F. 100π
- G. 25π
- H. 10π
- J. 5π
- K. 2π

23. At a certain school, 210 of the students are members of the sports teams, while the other 390 are not. What percent of the school's students are not on sports teams?

- A. 65%
- B. 53.8%
- C. 35%
- D. 27.2%
- E. 6.5%

24. $(6 - 3\sqrt{2})(2 + 2\sqrt{2}) = ?$

- F. $12 + 6\sqrt{2}$
- G. $12 - 6\sqrt{2}$
- H. $12 + 12\sqrt{2}$
- J. $12 - 12\sqrt{2}$
- K. $6\sqrt{2}$

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DO YOUR FIGURING HERE.

25. Deena has 3 coats, 3 scarves, and 4 hats that go together well in any combination. How many different combinations can Deena put together consisting of a coat, a scarf, and a hat?

- A. 36
- B. 24
- C. 15
- D. 13
- E. 10

26. What is the smallest positive value x such that $|6 - 2x| \leq 3$?

- F. $3/2$
- G. 2
- H. 3
- J. 4
- K. 6

27. What is the value of $x^3 + x^0$ when $x = 3$?

- A. 27
- B. 28
- C. 30
- D. 81
- E. 243

28. Which of the following expresses $6x - 3y = 9$ in slope-intercept form for the standard (x, y) coordinate plane?

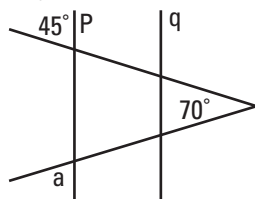
- F. $y = 2x - 3$
- G. $y = -2x - 3$
- H. $y = (1/2)x - 3$
- J. $y = -(1/2)x - 6$
- K. $y = -(1/2)x - 9$

29. $3/8 = x/56$. What is the value of x ?

- A. 7
- B. 16
- C. 21
- D. 27
- E. 30

30. In the figure below, p is parallel to q , and the measures of angles are as marked. What is the measure of angle a , in degrees?

- F. 65°
- G. 75°
- H. 110°
- J. 115°
- K. 135°

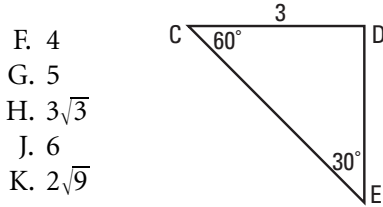


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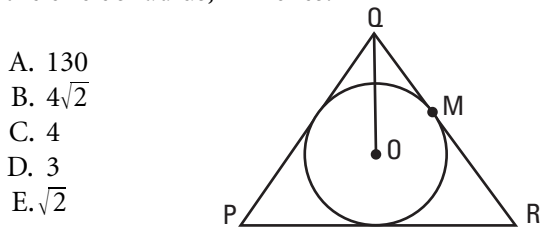
31. What is the smallest positive integer x , such that $|5 - 3x| \geq 4$?

- A. 2
- B. 3
- C. 5
- D. 6
- E. 8

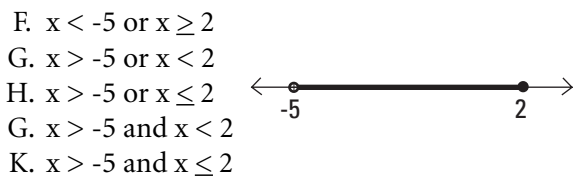
32. In the figure below, lengths in units and angle measures in degrees are as marked. How long is DE, in units?



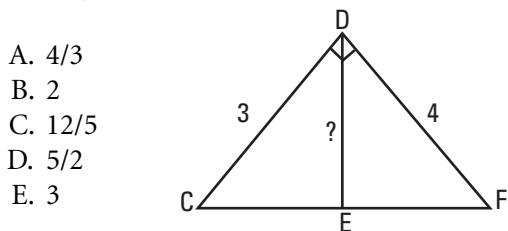
33. In the figure below, a circle, with center O, is inscribed in triangle PQR, and M is a point of tangency of the circle with QR. If QM is 7 inches long, and QO is 9 inches long, what is the length of the circle's radius, in inches?



34. Which of the following logical statements identifies the same set as the graph shown below?



35. In right triangle CDF below, DE is perpendicular to the hypotenuse CF. If the length of DC is 3 units, and the length of DF is 4 units, how many units long is DE?



36. Which of the following is an equation of the circle that has its center at C (1, 2) and passes through A (4, 6) in the standard (x, y) coordinate plane?

F. $(x + 1)^2 + (y + 2)^2 = 16$
 G. $(x - 1)^2 + (y - 2)^2 = 25$
 H. $(x + 2)^2 + (y + 1)^2 = 16$
 J. $(x - 2)^2 + (y - 1)^2 = 25$
 K. $(x - 1)^2 + (y - 4)^2 = 9$

37. Fred needs a test average of at least 93 to make an "A" in his math class. If he has test scores of 91, 84, 93, 99, and 97, on 5 of his six tests, what is the lowest score he can make on his 6th test in order to get an "A" in math?

A. 93
 B. 94
 C. 96
 D. 97
 E. 99

38. What is the slope of any line parallel to the y-axis in the (x,y) coordinate plane?

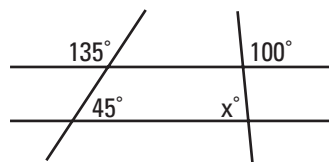
F. -1
 G. 0
 H. 1
 J. Undefined
 K. Cannot be determined from the given information

39. In selecting the appropriate length of skis for a beginning skier, a constant proportion of the skier's height is recommended. If 250 centimeter long skis are recommended for a skier 200 centimeters tall, how many centimeters long are the skis recommended for a 150 centimeter tall skier?

A. 182
 B. 187.5
 C. 192
 D. 200
 E. 206.5

40. In the figure below, in which the 4 lines intersect at the indicated angles, $x^\circ = ?$

F. 80°
 G. 70°
 H. 65°
 J. 50°
 K. 45°



DO YOUR FIGURING HERE.

41. What value must be added to $4x^2 - 12x$ to “complete the square” (make it a perfect-square trinomial)?

- A. -9
- B. 9
- C. 12
- D. 16
- E. 18

42. Mary placed 11 red balls, 3 green balls, and 6 orange balls into a container. Mary then began to draw balls from the container at random. The first ball that she drew was red. The second ball that she drew was green, and the third ball that she drew was orange. What is the probability that the fourth ball that Mary draws will be red?

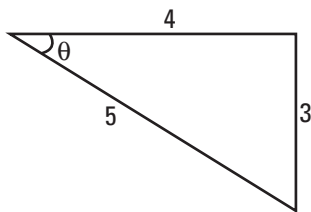
- F. 11/20
- G. 11/17
- H. 10/17
- J. 3/10
- K. 3/20

43. A certain square has a perimeter of 36 feet and a certain triangle has sides with lengths 3, 4, and 5 feet. What is the sum of the areas of these two figures, in square feet?

- A. 87
- B. 53
- C. 46
- D. 42
- E. 38

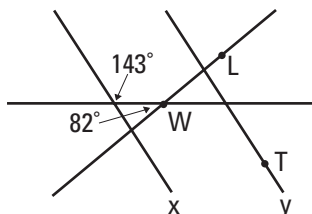
44. Referring to the triangle depicted below, $\sin \theta = ?$

- F. 4/3
- G. 5/4
- H. 4/5
- J. 3/4
- K. 3/5



45. Two transversals intersect at W, a point between the 2 parallel lines, x and y. The measures of angles are as marked on the figure below. What is the measure of angle TLW?

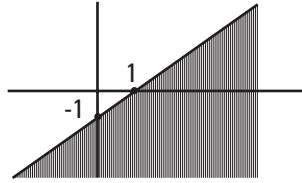
- A. 61°
- B. 72°
- C. 79°
- D. 81°
- E. 93°



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46. Which of the following inequalities does the shaded region below represent?

- F. $x + y \geq -1$
- G. $x + y \leq -1$
- H. $y \geq x - 1$
- J. $y \leq x - 1$
- K. $y - 1 = x$



47. In the (x, y) coordinate plane, a line passes through the point $(2, 7)$ and has a slope of 3. What is the y -coordinate of a point on the line having an x -coordinate of 4?

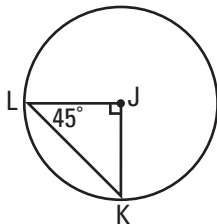
- A. -1
- B. 0
- C. 1
- D. 9
- E. 13

48. A square has an area of 60.2 square inches. If k is the side length of the square in centimeters, then k must lie between which 2 consecutive integers?

- F. $5 < k < 6$
- G. $6 < k < 7$
- H. $7 < k < 8$
- J. $30 < k < 31$
- K. $60 < k < 61$

49. Triangle JKL is contained within the circle below. The center of the circle is point J . Side KL equals $3\sqrt{2}$. Angle measures and side lengths are given in the figure. What is the area of the circle, in square inches?

- A. 72π
- B. 36π
- C. 18π
- D. 10π
- E. 9π



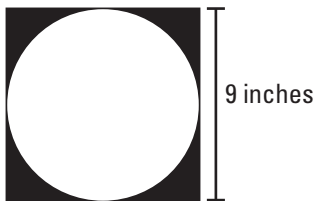
50. A certain circle has a circumference of 36π centimeters. What is the length of the circle's radius, in centimeters?

- F. 6
- G. 18
- H. 24
- J. 36
- K. 72

DO YOUR FIGURING HERE.

51. Below is a circle inscribed in a square. Measures shown are in inches. What is the area of the shaded region, in square inches?

- A. $81 - 3\pi$
- B. $81 - 9\pi$
- C. $81 - 20.25\pi$
- D. $36 - 3\pi$
- E. $36 - 20.25\pi$



52. What is the solution set for the equation $|-2x| = -2x$?

- F. Only $x = 0$
- G. Only $x = 1$
- H. All $x \neq 0$
- J. All $x \leq 0$
- K. All real numbers

53. If $10a + 5b = 22$ and $7.5a = 10b$, what is the value of $a + b$?

- A. 1.2
- B. 1.6
- C. 1.8
- D. 2.6
- E. 2.8

54. In the standard (x, y) coordinate plane, what is the distance between the points with coordinates $(4, 5)$ and $(3, -2)$?

- F. $2\sqrt{51}$
- G. $6\sqrt{3}$
- H. $5\sqrt{2}$
- J. $\sqrt{11}$
- K. $\sqrt{7}$

55. Compared to the graph of $\sin \theta$, the graph of $2 \sin 3\theta$ has:

- A. 5 times the amplitude and 3 times the period
- B. 4 times the amplitude and 5 times the period
- C. 3 times the amplitude and 2 times the period
- D. 2 times the amplitude and 3 times the period
- E. 2 times the amplitude and $1/3$ the period

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DO YOUR FIGURING HERE.

56. Joe can type k words per minute (where $k > 0$). Theodore can type 4 times as many words per minute. Which of the following general equations determines the time, t , in minutes, that it would take both typists working together to type 1,000,000 words?

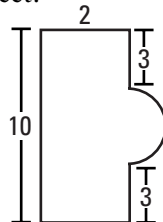
- F. $t = 1 / (1,000,000)(5k)$
- G. $t = 5k / 1,000,000$
- H. $t = (1,000,000)(5k)$
- J. $t = 1,000,000 / (k)(4k)$
- K. $t = 1,000,000 / 5k$

57. Using all pairs of nonzero numbers c and d such that $|c| = |d|$, which of the following choices lists all and only the possible real values of c/d ?

- A. Cannot be determined
- B. All real numbers
- C. -1
- D. ± 1
- E. 1

58. The figure below depicts a rectangle joined to a semicircle. Distances are shown in feet. What is the area of this figure, in square feet?

- F. $24 + 4\pi$
- G. $20 + 16\pi$
- H. $20 + 4\pi$
- J. $20 + 2\pi$
- K. $18 + 16\pi$



59. If $a = 2 + \sqrt{5}$ and $b = 2 - \sqrt{5}$, which of the following numbers must be rational?

- I. a/b
- II. $a + b$
- III. ab

- A. I only
- B. II only
- C. III only
- D. I and III only
- E. II and III only

60. What is the smallest possible value for the product of 2 real numbers that differ by 8?

- F. -64
- G. -16
- H. -8
- J. 0
- K. 16

END OF MATHEMATICS TEST.**STOP!****DO NOT TURN THE PAGE
UNTIL TOLD TO DO SO.**