

MATHEMATICS TEST

Directions: Solve each problem, choose the correct answer, and then fill in the corresponding oval on your answer document.

Do not linger over problems that take too much time. Solve as many as you can; then return to the others in the time you have left for this test.

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. What is the value of the expression $(y - x)^3$ when $x = 5$ and $y = 1$?
 - A. -64
 - B. -4
 - C. 4
 - D. 16
 - E. 64
2. What is the smallest positive integer that is divisible by 3, divisible by 5, and divisible by 6 (with no remainders)?
 - F. 15
 - G. 30
 - H. 60
 - J. 90
 - K. 180
3. If $[-s + h(t \cdot 3 - w)]r = 1$, then which of the following variables CANNOT equal 0?
 - A. h
 - B. r
 - C. s
 - D. t
 - E. w

GO ON TO THE NEXT PAGE.

2**2****DO YOUR FIGURING HERE.**

4. In a certain school district, exactly 30% of the students come from families that have only one child. If there are 7,340 students in the district, how many do NOT come from families with only one child?

F. 220
 G. 514
 H. 2,202
 J. 5,138
 K. 7,120

5. For all $x < 3$, $(3 - 2x)^2 = ?$

A. x^2
 B. $9 - x^2$
 C. $9 + x^2$
 D. $9 - 10x - 4x^2$
 E. $9 - 12x + 4x^2$

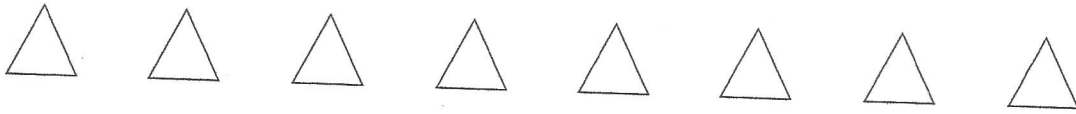
6. What is the slope-intercept form of the equation $3y + 2x = 24$?

F. $y = -\frac{2x}{3} + 8$
 G. $y = -\frac{3x}{2} + 12$
 H. $3 = 2m + b$
 J. $m = 2b + 24$
 K. $y = 2x + 24$

7. What is the slope of a line perpendicular to the line $3x + 2y = 19$?

A. $-\frac{3}{2}$
 B. $-\frac{2}{3}$
 C. $\frac{2}{3}$
 D. $\frac{3}{2}$
 E. 3

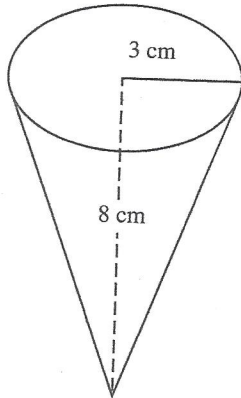
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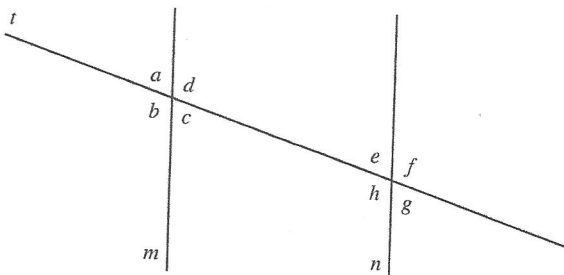
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DO YOUR FIGURING HERE.

8. The volume of a cone is given by the formula $V = \frac{\pi}{3} r^2 h$, where r is the radius of the base of the cone and h is the height of the cone. What is the volume, in cubic centimeters, of a cone with a height of 8 cm that has a base with a radius of 3 cm?



- F. 72π
 - G. 48π
 - H. 24π
 - J. 12π
 - K. 8π
9. Given that m and n are parallel lines, t is a transversal crossing both m and n , and $m \angle b = 100^\circ$, what is the measure of $\angle e$?



- A. 40°
- B. 50°
- C. 80°
- D. 100°
- E. 120°

2



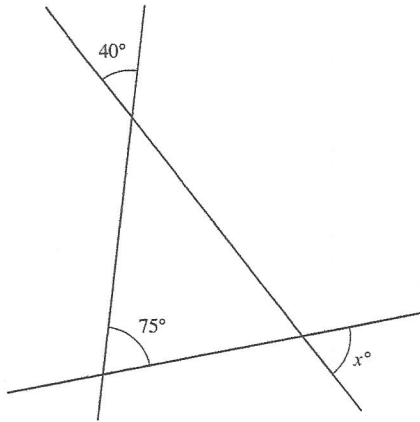
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DO YOUR FIGURING HERE.

10. In the figure below, 3 lines intersect at the indicated angles.

What is the degree measure of $\angle x$?

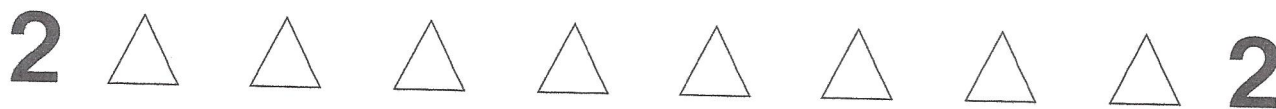
- F. 35°
 G. 52.5°
 H. 65°
 J. 70°
 K. 75°



11. Find two arithmetic means between 11 and 26 such that the difference between consecutive numbers is the same:

11, _____, _____, 26

- A. 14, 18
 B. 15, 20
 C. 16, 21
 D. 17, 23
 E. 18, 24
12. For all real numbers x and y , $(2x + 3y)^2 = ?$
- F. $6x^2y^2$
 G. $4x^2 + 6y^2$
 H. $4x^2 + 9y^2$
 J. $4x^2 + 6xy + 6y^2$
 K. $4x^2 + 12xy + 9y^2$
13. In a certain town in New Hampshire, there are 7,695 registered voters, 60% of whom are Democrats. How many of the town's registered voters are Democrats?
- A. 513
 B. 2,565
 C. 3,078
 D. 4,617
 E. 7,695



DO YOUR FIGURING HERE.

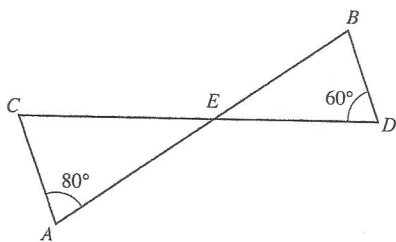
14. Which of the following lines has the same graph as the line $2x - y = 12$?

F. $6x + 3y = 36$
 G. $4x + 2y = 24$
 H. $4x - 2y = 12$
 J. $4x - 4y = 24$
 K. $-6x + 3y = -36$

15. When $\frac{1}{3}w + \frac{2}{5}w = 1$, what is the value of w ?

A. $\frac{1}{11}$
 B. $\frac{3}{8}$
 C. $\frac{11}{15}$
 D. $\frac{15}{11}$
 E. $\frac{8}{3}$

16. In the figure below, \overline{AB} and \overline{CD} bisect each other at E . The measure of $\angle CAE$ is 80° and the measure of $\angle BDE$ is 60° . What is the measure of $\angle CEA$?

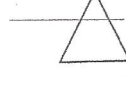
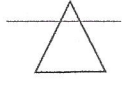


F. 10°
 G. 30°
 H. 40°
 J. 60°
 K. Cannot be determined

17. Given that $A = (3, 2)$ and $B = (15, 8)$ in the standard (x, y) coordinate plane, what is the distance from A to B ?

A. $5\sqrt{2}$
 B. 8
 C. $4\sqrt{10}$
 D. $6\sqrt{5}$
 E. 18

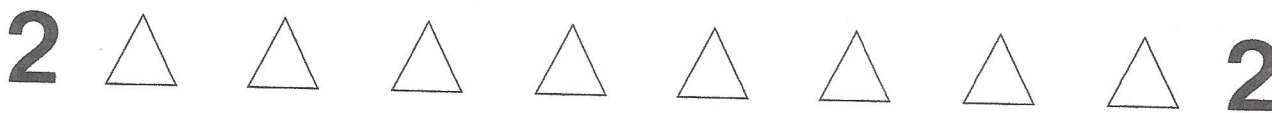
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DO YOUR FIGURING HERE.

18. For all real numbers a , b , and c such that $a < b$ and $c > 0$, which of the following inequalities, if any, must be true?
- F. $a < c$
 G. $b < c$
 H. $a > c$
 J. $b > c$
 K. None of the above inequalities must be true.
19. A deli offers 4 types of sandwich meat, 3 kinds of cheese, and 5 bread varieties. When you order a sandwich at the deli, you are allowed to choose 1 meat, 1 cheese, and 1 type of bread. How many different sandwich combinations are possible at the deli?
- A. 3
 B. 12
 C. 15
 D. 30
 E. 60
20. At a certain company, 240 of the employees are women and the remaining 160 are men. What percentage of the company's workers are women?
- F. 25%
 G. $33\frac{1}{3}\%$
 H. 40%
 J. 60%
 K. $66\frac{2}{3}\%$
21. Alana leaves home to drive to college. She drives 200 miles in 4 hours before stopping for gas. She then drives 10 miles per hour faster than she did on the first part of her trip, and arrives at her dorm in 3 hours. How many miles did she drive in total?
- A. 200
 B. 300
 C. 350
 D. 380
 E. 430
22. If the monthly payment, M dollars, on a house that costs P dollars is given by the formula $M = \frac{P}{200} - .0008P + 40$, what is the monthly payment, to the nearest dollar, on a house that costs \$200,000?
- F. \$868
 G. \$880
 H. \$960
 J. \$1,060
 K. \$1,200



DO YOUR FIGURING HERE.

23. What is the sum of the prime factors of the number 330?
- A. 6
B. 19
C. 21
D. 22
E. 43
24. In the standard (x, y) coordinate plane, a line passes through the points $(1, -2)$ and $(5, 10)$. At which of the following points does the line cross the y -axis?
- F. $(-8, 0)$
G. $(-5, 0)$
H. $(0, 0)$
J. $(0, -5)$
K. $(0, -8)$
25. For all positive a, b , and c , $\frac{2^{-1}a^{-3}b^7c^2}{(5a)^2b^{-1}c^7} = ?$
- A. $\frac{2b^6}{5a^2c^5}$
B. $\frac{2b^8c^9}{2a^5}$
C. $\frac{2b^8c^9}{25a^5}$
D. $\frac{b^8}{10a^5c^5}$
E. $\frac{b^8}{50a^5c^5}$
26. One endpoint of a diameter of a circle with center $(2, -3)$ has coordinates at $(5, -2)$ in the standard (x, y) plane. What are the coordinates of the other endpoint of the diameter?
- F. $(2 - \sqrt{10}, -3 - \sqrt{10})$
G. $(-1, -4)$
H. $(0, -4)$
J. $(2 + \sqrt{10}, -3 + \sqrt{10})$
K. $(8, -1)$
27. Payton ran $1\frac{2}{3}$ miles on Monday, $2\frac{1}{5}$ miles on Tuesday, and $1\frac{7}{8}$ miles on Wednesday. What is the median distance that he ran?
- A. 7.200 miles
B. 5.742 miles
C. 1.914 miles
D. 1.875 miles
E. None of these.

2



2

DO YOUR FIGURING HERE.

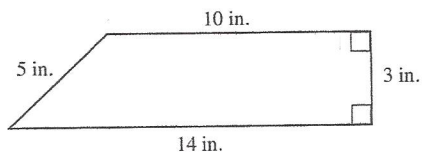
28. If $6x^2 + x - c = (cx - 1)(3x + 2)$, what is the value of c ?

- F. -2
- G. -1
- H. 2
- J. 3
- K. 6

29. What is the y -coordinate of the point of intersection of the lines $y = 3x - 7$ and $y = 5x + 5$ in the standard (x, y) coordinate plane?

- A. -25
- B. -11
- C. -6
- D. 6
- E. 11

30. What is the area, in square inches, of the figure shown below?



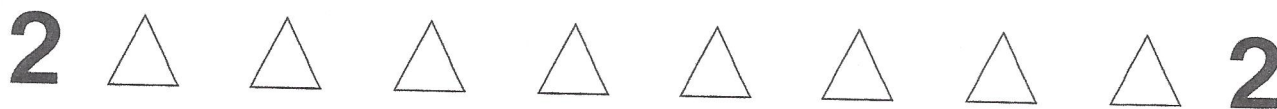
- F. 24
- G. 32
- H. 36
- J. 42
- K. 72

31. What is the solution set for the inequality $6 - 4(x - 2) > 4x + 5$?

- A. $x < -\frac{7}{8}$
- B. $x < -\frac{1}{4}$
- C. $x < \frac{9}{8}$
- D. $x > -\frac{7}{8}$
- E. $x > \frac{9}{8}$

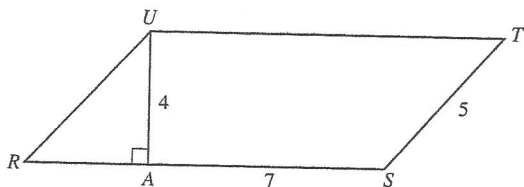
32. For the circle whose standard equation is $(x - 1)^2 + (y + 2)^2 = 8$, the center and radius are:

- F. center = $(-1, 2)$; radius = $2\sqrt{2}$.
- G. center = $(-1, 2)$; radius = 4.
- H. center = $(0, 0)$; radius = 4.
- J. center = $(1, -2)$; radius = $2\sqrt{2}$.
- K. center = $(1, -2)$; radius = 4.

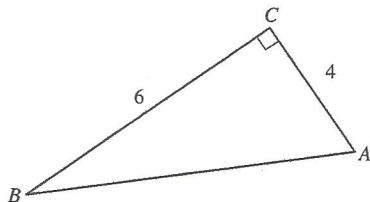


DO YOUR FIGURING HERE.

33. Parallelogram $RSTU$ is shown below, with $\overline{UA} = 4$ inches, $\overline{AS} = 7$ inches, and $\overline{ST} = 5$ inches. What is the area of $RSTU$ in square inches?



- A. 16
 B. 20
 C. 28
 D. 35
 E. 40
34. If the lengths of the sides of the triangle below are shown in inches, how many inches long is side \overline{AB} ?



- F. $2\sqrt{13}$
 G. 10
 H. $4\sqrt{13}$
 J. 26
 K. 42
35. Which of the following is the equation for a circle with diameter \overline{AB} , given that $A = (4, 2)$ and $B = (8, -4)$?
- A. $x^2 + y^2 = 13$
 B. $x^2 + y^2 = 26$
 C. $(x - 6)^2 + (y + 1)^2 = 13$
 D. $(x + 6)^2 + (y - 1)^2 = 13$
 E. $(x - 6)^2 + (y + 1)^2 = 26$
36. Which of the following comprises all of the values of x for which $\frac{2}{3}x - \frac{1}{2} < \frac{1}{2}x + \frac{2}{3}$?
- F. $x < 1$
 G. $x < \frac{7}{6}$
 H. $x < 7$
 J. $x > \frac{7}{3}$
 K. $x > 7$

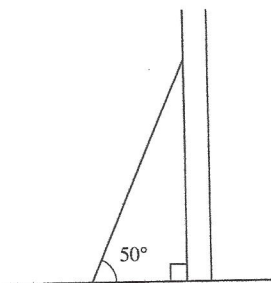
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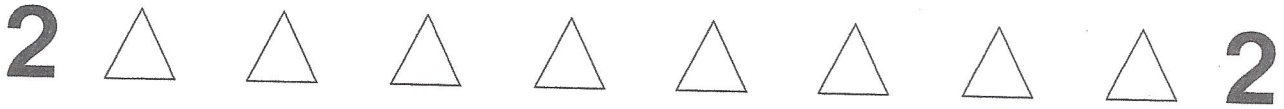
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DO YOUR FIGURING HERE.

37. A guide wire for a telephone tower makes an angle of 50° with the level ground and is 14 meters from the base of the tower. How many meters long is the guide wire?

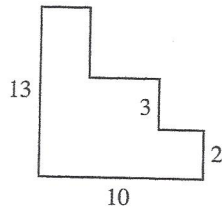


- A. 3.80
 B. 13.50
 C. 16.68
 D. 21.78
 E. 22.58
38. For all $x^2 \neq 9$, $\frac{(x-3)^2}{x^2-9}$ is equivalent to:
- F. -1
 G. $\frac{1}{2}$
 H. 1
 J. $\frac{1}{x+3}$
 K. $\frac{x-3}{x+3}$
39. In the standard (x, y) coordinate plane, the midpoint of \overline{AB} is $(5, 7)$ and A is located at $(2, 3)$. If the coordinates of B are (x, y) , what is the value of $(x + y)$?
- A. 19
 B. 17
 C. 11
 D. 8.5
 E. 8
40. If the solutions to the equation $(x + a)(x + b) = 0$ are $x = 8$ and $x = -\frac{3}{2}$, then $a + b = ?$
- F. -13
 G. -12
 H. -6.5
 J. 6.5
 K. 12



DO YOUR FIGURING HERE.

41. In the figure below, all line segments intersect at right angles, and all measurements are given in inches. What is the perimeter of the figure in inches?



- A. 23
 B. 28
 C. 46
 D. 130
 E. Cannot be determined
42. If $\cot \theta = P$, which of the following expressions must also equal P ?
- F. $\tan \theta$
 G. $\csc \theta - 1$
 H. $\sin \theta - \cos \theta$
 J. $\frac{\sin \theta}{\cos \theta}$
 K. $\frac{\cos \theta}{\sin \theta}$
43. A line in the standard (x, y) coordinate plane contains the points $(5, 9)$ and $(8, 3)$. What is the x -intercept of this line?
- A. 19
 B. $\frac{19}{2}$
 C. 0
 D. -2
 E. $-\frac{19}{2}$
44. Each side of a given cube is a square with an area of 729 square inches. What is the volume of the cube in cubic inches?
- F. 3^3
 G. 3^9
 H. 3^{12}
 J. 3^{18}
 K. 3^{64}

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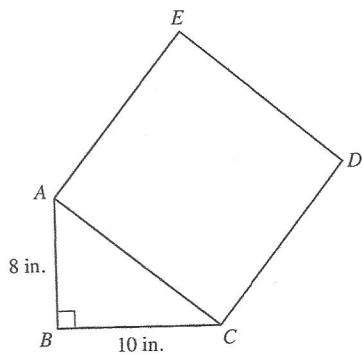
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DO YOUR FIGURING HERE.

45. If p and q are positive integers, and $6pq^4$ and $12p^2q^2$ have a greatest common factor of 1,050, then which of the following is a possible value for the sum of p and q ?

- A. 6
B. 8
C. 12
D. 35
E. 42

46. In the figure shown below, $\triangle ABC$ is a right triangle, \overline{AB} is 8 inches long, and \overline{BC} is 10 inches long. What is the area, in square inches, of square $ACDE$?



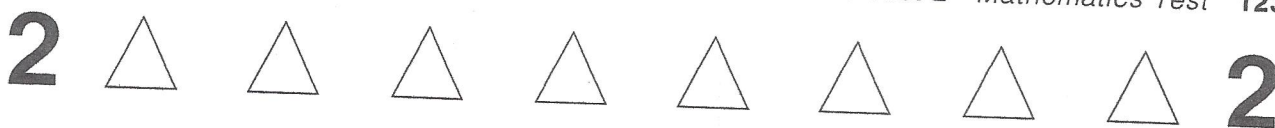
- F. $2\sqrt{41}$
G. $\sqrt{164}$
H. 36
J. $8\sqrt{41}$
K. 164

47. In the standard coordinate plane, what is the distance between the points $(5, 7)$ and $(13, 11)$?

- A. 80
B. 12
C. $\sqrt{80}$
D. 8
E. $\sqrt{8}$

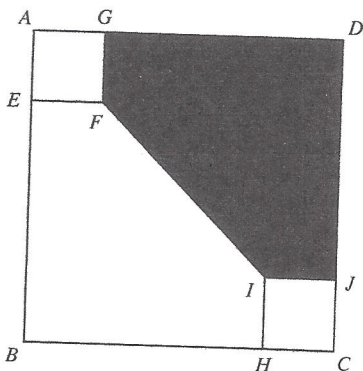
48. What value must be added to $9x^2 - 30x$ in order to complete the square (that is, make it a perfect square trinomial)?

- F. -5
G. 5
H. 9
J. 25
K. 45



DO YOUR FIGURING HERE.

49. A circle in the standard (x, y) coordinate plane is tangent to the x -axis at $-a$, and tangent to the y -axis at a , with $a > 0$. The radius of the circle is 4 units. What is the equation of the circle?
- A. $x^2 + y^2 = 4$
 B. $x^2 + y^2 = 16$
 C. $(x - 4)^2 + (y - 4)^2 = 4$
 D. $(x + 4)^2 + (y + 4)^2 = 16$
 E. $(x + 4)^2 + (y - 4)^2 = 16$
50. Compared to the graph of $y = \sin x$, the graph of $y = 2 \sin(4x)$ has:
- F. 8 times the amplitude and the same period.
 G. 2 times the amplitude and 4 times the period.
 H. 2 times the amplitude and $\frac{1}{4}$ the period.
 J. $\frac{1}{2}$ the amplitude and 4 times the period.
 K. $\frac{1}{2}$ the amplitude and $\frac{1}{4}$ the period.
51. Which of the following is the solution set for x such that $3x - 9 \geq -3(9 - x)$?
- A. The empty set
 B. The set containing only zero
 C. The set of negative numbers
 D. The set of positive numbers
 E. The set of real numbers
52. In the figure below, square $ABCD$ has a side length of 6 inches, and squares $AEFG$ and $CHIJ$ each have a side length of 1 inch. What is the area, in square inches, of the shaded pentagon $DGFIJ$?



- F. 9
 G. 12.5
 H. 17
 J. 18
 K. 20.5

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DO YOUR FIGURING HERE.

53. Let the operation # be defined for the set of real numbers by:

$$x \# y = \frac{x + y}{3}.$$

Which of the following statements are true for all real numbers x , y , and z ?

- I. $x \# y = y \# x$
- II. $(x \# y) \# z = x \# (y \# z)$
- III. $0 \# x = 0$

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

54. If $x^2 - 36a^2 = 5ax$, what are the two solutions for x in terms of a ?

- F. $-4a$ and $-9a$
- G. $-4a$ and $9a$
- H. $-3a$ and $12a$
- J. $3a$ and $-12a$
- K. $4a$ and $-9a$

55. For all values of θ over which $\sin \theta$ and $\cos \theta$ are nonzero, $\frac{\sqrt{1 - \cos^2 \theta}}{\sin^2 \theta} \cdot \cos \theta = ?$

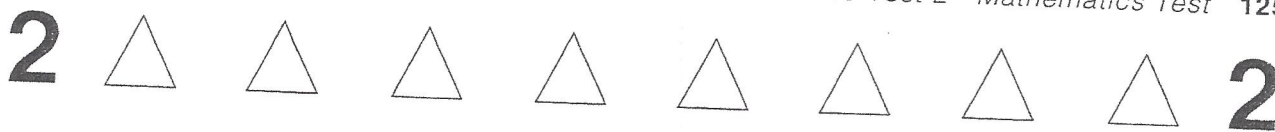
- A. 1
- B. $\tan \theta$
- C. $\cot \theta$
- D. $\sec \theta$
- E. $\csc \theta$

56. For values of x where $\csc x$, $\sec x$, and $\tan x$ are all defined, $(\csc x) \cdot (\sec x) \cdot (\tan x) = ?$

- F. $\sec^2 x$
- G. $\csc^2 x$
- H. $\tan^2 x$
- J. 1
- K. -1

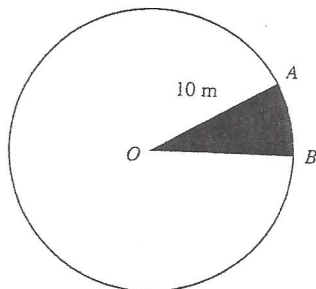
57. What is the solution set for the equation $| -x | = x$?

- A. All real numbers
- B. $x \geq 0$
- C. $x \leq 0$
- D. Only $x = 0$
- E. Only $x = -1$



DO YOUR FIGURING HERE.

58. For which of the following values of a will there be exactly one real solution to the equation $2x^2 - ax + 8 = 0$?
- F. $2\sqrt{3}$
 G. 4
 H. $4\sqrt{3}$
 J. 6
 K. 8
59. If $x = 3t + 4$ and $y = 5 - t$, then which of the following equations expresses y in terms of x ?
- A. $y = \frac{19-x}{3}$
 B. $y = \frac{1-x}{3}$
 C. $y = 9 - x$
 D. $y = x + 9$
 E. $y = x - 1$
60. In the circle below, radius \overline{OA} has a length of 10 meters, and central angle $\angle AOB$ measures 30° . What is the area, in square meters, of shaded sector AOB ?



- F. $\frac{5\pi}{6}$
 G. $\frac{5\pi}{3}$
 H. $\frac{10\pi}{3}$
 J. $\frac{25\pi}{6}$
 K. $\frac{25\pi}{3}$



If there is still time remaining, check your answers to this section.

Answer Key

PRACTICE TEST 2

English Test

1. A	16. F	31. D	46. F	61. C
2. G	17. C	32. G	47. C	62. G
3. C	18. F	33. A	48. F	63. B
4. G	19. D	34. G	49. A	64. G
5. C	20. G	35. D	50. J	65. A
6. J	21. A	36. F	51. D	66. J
7. A	22. J	37. B	52. H	67. B
8. H	23. C	38. H	53. B	68. F
9. A	24. H	39. B	54. J	69. B
10. J	25. A	40. J	55. B	70. F
11. D	26. F	41. C	56. G	71. B
12. H	27. B	42. F	57. A	72. G
13. C	28. J	43. A	58. H	73. D
14. G	29. A	44. G	59. B	74. H
15. C	30. J	45. B	60. J	75. D

Math Test

1. A	13. D	25. E	37. D	49. E
2. G	14. K	26. G	38. K	50. H
3. B	15. D	27. D	39. A	51. E
4. J	16. H	28. H	40. H	52. H
5. E	17. D	29. A	41. C	53. A
6. F	18. K	30. H	42. K	54. G
7. C	19. E	31. C	43. B	55. C
8. H	20. J	32. J	44. G	56. F
9. C	21. D	33. E	45. C	57. B
10. H	22. G	34. F	46. K	58. K
11. C	23. C	35. C	47. C	59. A
12. K	24. J	36. H	48. J	60. K