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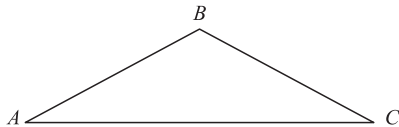
MATHEMATICS TEST

60 Minutes—60 Questions

DIRECTIONS: Solve each of the problems in the time allowed, then fill in the corresponding bubble on your answer sheet. Do not spend too much time on any one problem; skip the more difficult problems and go back to them later. You may use

a calculator on this test. For this test you should assume that figures are NOT necessarily drawn to scale, that all geometric figures lie in a plane, and that the word *line* is used to indicate a straight line.

1. In triangle ABC below, the measure of angle A is 20° and the measure of angle B is 3 times larger than the measure of angle C . What is the measure of angle B ?



- A. 40°
B. 60°
C. 80°
D. 120°
E. 160°
2. The 65-member high school band raised money to go on a trip by having a bake sale. If the original cost per band member for the trip is \$18.50 and the band members earned a total of \$585.00 at the bake sale, how much more money does each band member need in order to pay for the trip?
F. \$9.00
G. \$9.50
H. \$18.50
J. \$46.50
K. \$65.00
3. Fred works at a car wash where he makes \$40.00 per day plus \$1.75 per car that he washes. Yesterday, Fred made a total of \$61.00. How many cars did he wash yesterday?
A. 10
B. 12
C. 17
D. 20
E. 34

DO YOUR FIGURING HERE.

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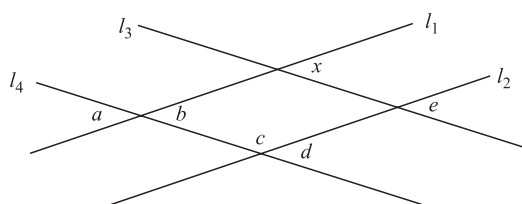
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4. Molality, m , tells us the number of moles of solute dissolved in exactly 1 kilogram (kg) of solvent. Molality is represented by the equation, $m = \frac{s}{k}$, where s represents the moles of solute and k represents the mass of the solvent in kilograms. A solution is known to have a molality of 0.2 and contain 13 kg of solvent. What is the number of moles of solute contained in the solution?

F. 0.01
G. 2.6
H. 3.2
J. 26
K. 32

DO YOUR FIGURING HERE.

5. In the figure below, l_1 is parallel to l_2 , and l_3 is parallel to l_4 . Which of the following angles is NOT equal to angle x ?



- A. a
B. b
C. c
D. d
E. e
6. Which of the following is equivalent to 4.2×10^{-5} ?
F. 0.000042
G. 0.00042
H. 42,000
J. 420,000
K. 4,200,000
7. $3.234 \times 0.01 = ?$
A. 323.4
B. 32.34
C. 3.234
D. 0.3234
E. 0.03234
8. For all $x \neq 1$, $\frac{x^2 - 2x + 1}{x - 1}$ is equal to ?
F. 1
G. $x + 2$
H. x^2
J. $\frac{x + 2}{x - 1}$
K. $x - 1$

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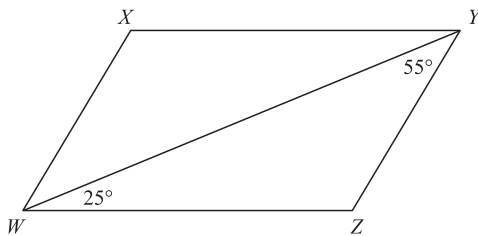
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9. If $9 - x^3 + 2 = 19$, what is the value of x ?

A. -2
 B. -1
 C. 2
 D. 3
 E. 8

DO YOUR FIGURING HERE.

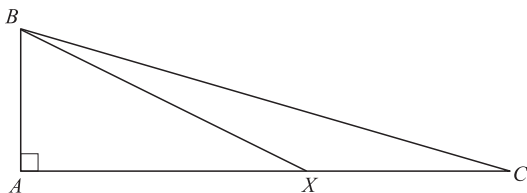
10. In the parallelogram below, what is the measure of $\angle WXY$?



- F. 25°
 G. 55°
 H. 65°
 J. 100°
 K. 120°
11. The graph below represents which of the following inequalities?



- A. $x > 1$
 B. $x < -1$
 C. $x \leq -1$
 D. $x \geq -1$
 E. $-1 > x > 1$
12. If $93 - x = 342$, then $x = ?$
- F. -435
 G. -249
 H. -156
 J. 249
 K. 435
13. In the figure below, triangles ABC and ABX are both right triangles. If the length of \overline{AB} is 6 units, the length of \overline{BX} is 10 units, and the length of \overline{XC} is 4 units, what is the length of \overline{BC} ?



- A. $\sqrt{11}$
 B. $2\sqrt{3}$
 C. $2\sqrt{10}$
 D. $2\sqrt{35}$
 E. $6\sqrt{5}$

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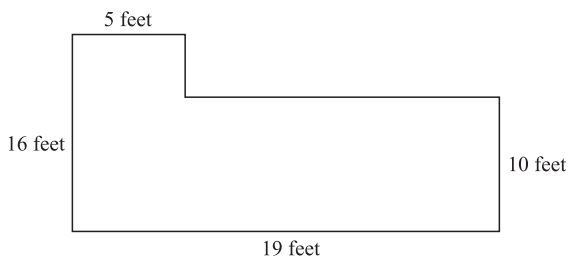
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14. A rectangular parking lot has an area 315 square yards. Its length (l) is 3 times its width (w). Which of the following equations could you use to determine the width of the parking lot?
- F. $3w \times w = 315$
G. $3l \times l = 315$
H. $w \times 3 = 315$
J. $w = \frac{315}{3}$
K. $w - 3 = 315$

DO YOUR FIGURING HERE.

15. Jordan went for a 3.5-mile jog on Monday that took him 40 minutes. If on Tuesday Jordan jogs at the same rate of speed, how far will he jog in 60 minutes?
- A. 3.5 miles
B. 4.0 miles
C. 5.25 miles
D. 7.0 miles
E. 7.25 miles

16. A floor has the dimensions shown below. How many square feet of tile are needed to cover the entire floor?



- F. 50
G. 95
H. 160
J. 190
K. 220
17. There are 32 ounces in a quart. If 2 quarts of milk costs \$2.65, what is the cost of milk per ounce, to the nearest cent?
- A. \$0.04
B. \$0.08
C. \$0.24
D. \$0.41
E. \$0.64

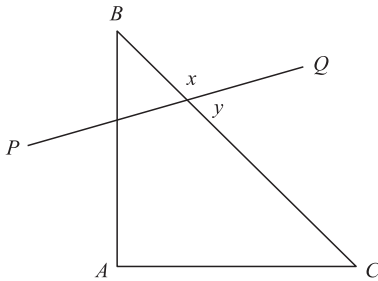
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18. In the figure below, triangle ABC is a 30–60–90 right triangle. If angle x measures 125° , what is the measure of angle y ?



DO YOUR FIGURING HERE.

- F. 35°
 G. 45°
 H. 55°
 J. 70°
 K. 90°
19. Given the system of equations below, $x = ?$

$$y + 3x = 9$$

$$2x - \frac{1}{3}y = 6$$

- A. 1
 B. 3
 C. 5
 D. 7
 E. 9
20. $\frac{\left(\frac{5}{4}\right)\left(\frac{4}{3}\right)}{\left(\frac{1}{3}\right)\left(\frac{2}{3}\right)} = ?$

- F. $\frac{2}{5}$
 G. $\frac{7}{15}$
 H. $\frac{4}{5}$
 J. $\frac{7}{4}$
 K. $\frac{15}{2}$
21. For all x , $x^2 - (3x - 2) + 2x(4x - 1) = ?$
- A. $x^2 - 5x - 2$
 B. $9x^2 + 5x - 2$
 C. $9x^2 - 5x + 2$
 D. $8x^2 - 3x$
 E. $9x^2 - 4x + 2$

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22. For all $x \neq -3$, $\frac{x^2 - 6x + 9}{6x - 18} = ?$

F. $\frac{x+3}{x-3}$

G. $\frac{x-3}{6}$

H. $\frac{1}{x-3}$

J. $x-3$

K. $\frac{x}{3}$

DO YOUR FIGURING HERE.

23. If $x = 3$ is 1 solution for the equation $2x^2 - 5x - a = 0$, what is the value of a ?

A. -2

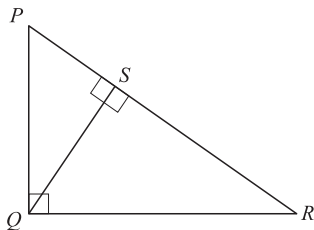
B. 0

C. 3

D. 5

E. 6

24. In the figure below, triangles PQR , PSQ , and QSR are right triangles. If the measure of angle P is 55° , what is the measure of angle R ?



F. 35°

G. 45°

H. 55°

J. 65°

I. 75°

25. Daniel is painting a wall in his bedroom. He can cover 36 square feet with 1 gallon of paint. If the wall is 8 feet high and 12 feet long, how many gallons, to the nearest whole gallon, will Daniel need to paint the wall?

A. 20

B. 16

C. 12

D. 4

E. 3

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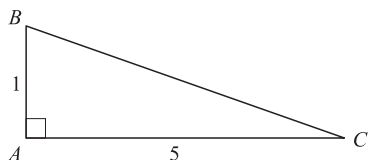


26. For all values, x , y , and z , if $x \leq y$ and $y \leq z$, which of the following CANNOT be true?

- I. $x = z$
 - II. $x > z$
 - III. $x < z$
- F. I only
 - G. II only
 - H. III only
 - J. I and II only
 - K. I, II, and III

DO YOUR FIGURING HERE.

27. As shown in the figure below, what is the sine of angle C ?



- A. $\frac{1}{5}$
 - B. $\frac{1}{\sqrt{26}}$
 - C. $\frac{\sqrt{26}}{5}$
 - D. 5
 - E. $\sqrt{26}$
28. What is the sum of all the solutions to $\frac{4x}{x-1} = \frac{4x}{2x+2}$?

- F. -3
- G. -2
- H. 2
- J. 5
- K. 8

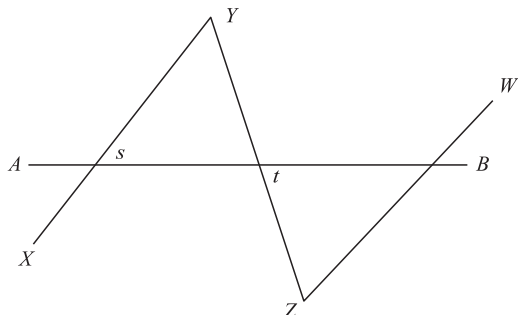
29. $|-2|^2 + |-5| - 3 = ?$

- A. 0
- B. 6
- C. 8
- D. 10
- E. 13

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30. In the figure below, parallel lines XY and ZW are bisected by line AB . If the lengths of XY , YZ , and ZW are the same, and angle t is 45° , then what is the measure of angle s ?



DO YOUR FIGURING HERE.

- F. 25°
 G. 45°
 H. 55°
 J. 75°
 K. 90°
31. If $x^2 - 3 \leq 13$, what is the greatest real value that x can have?
 A. 10
 B. 5
 C. 4
 D. 3
 E. 0
32. In an isosceles right triangle, the hypotenuse is 12. What is the length of one (1) of the sides?
 F. $6\sqrt{2}$
 G. $2\sqrt{6}$
 H. $2\sqrt{4}$
 J. $2\sqrt{3}$
 K. $\sqrt{3}$
33. In the standard (x,y) coordinate plane, what is the center of a circle with the equation $(x - 2)^2 + (y + 1)^2 = 4$?
 A. $(-2,1)$
 B. $(-2,4)$
 C. $(2,-1)$
 D. $(4,-2)$
 E. $(-2,2)$
34. What is the slope of the line determined by the equation $2x - 3y = 6$?
 F. -6
 G. -3
 H. $-\frac{3}{2}$
 J. $\frac{2}{3}$
 K. 2

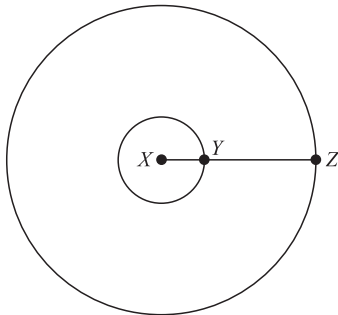
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35. Fifty (50) households were surveyed to determine the number of TVs in each of the households. The number of TVs in each household is shown in the chart below. What is the average number of TVs per household for these 50 households?

No. of TVs in household	2	3	4	5
No. of households	5	20	15	10

- A. 1.0
 B. 1.3
 C. 2.7
 D. 3.6
 E. 4.2
36. In the figure below, both circles are centered around X . The length of XY is 2 units and the length of XZ is 6 units. If the smaller circle is cut out of the larger circle, how much of the area, in square units, of the larger circle will remain?



- F. 12π
 G. 16π
 H. 32π
 J. 36π
 K. 40π
37. In the standard (x,y) coordinate plane, what is the x intercept of a line that has a slope of $\frac{2}{3}$ and passes through the point $(-2,2)$?
- A. $(-3,0)$
 B. $(-5,0)$
 C. $(3,0)$
 D. $(0,-2)$
 E. $(2,0)$
38. The figure below represents a solution set for which of the following inequalities?



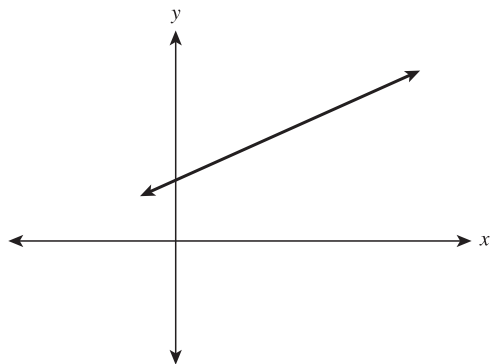
- F. $-2x + 12 < x - 2$
 G. $4x - 2 \geq 2x - 3$
 H. $5x + 5 \geq x$
 J. $3x - 1 \leq 5x + 3$
 K. $6x - 3 > 3x + 2$

DO YOUR FIGURING HERE.

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39. What is the slope of the line pictured in the standard (x,y) coordinate plane below that passes through $(1,3)$ and $(5,5)$ in the standard (x,y) coordinate plane?

**DO YOUR FIGURING HERE.**

- A. -2
B. $-\frac{2}{5}$
C. $\frac{1}{5}$
D. $\frac{1}{2}$
E. $\frac{5}{3}$
40. A formula for calculating simple interest is $I = Pr$, where I is the interest earned in dollars, P is the principal or original investment, and r is the fixed rate of interest. If the amount of interest earned is \$2.25 and the interest rate is 3%, what is P ?
- F. \$6.75
G. \$7.50
H. \$13.30
J. \$67.50
K. \$75.00
41. Three vertices of a rectangle in the standard (x,y) coordinate plane have the coordinates $(-2,3)$, $(4,3)$ and $(4,2)$. What are the coordinates of the fourth vertex?
- A. $(-2,-2)$
B. $(3,-3)$
C. $(-3,3)$
D. $(2,-2)$
E. $(-2,2)$

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42. If two lines in the standard (x,y) coordinate plane are perpendicular and the slope of one of the lines is $-\frac{5}{7}$, what is the slope of the other line?

F. $\frac{7}{5}$

G. $\frac{5}{7}$

H. $-\frac{5}{7}$

J. $-\frac{7}{5}$

K. -5

43. Anne made apple jelly and applesauce out of a bushel of apples. If the number of jars of jelly, j , is 3 less than twice the number of jars of applesauce, a , which expression shows the relationship of jars of jelly, j , to the jars of applesauce, a ?

A. $2j = 2a - 3$

B. $j - 3 = 2a$

C. $2j = 3a$

D. $j + 3 = 2a$

E. $ja = 2a$

44. What are the solutions for the equation $3x^2 - 5x + 2 = 0$?

F. $x = -1, x = -\frac{3}{2}$

G. $x = 1, x = \frac{2}{3}$

H. $x = -5, x = \frac{2}{3}$

J. $x = \frac{2}{5}, x = 1$

K. $x = -1, x = \frac{3}{2}$

45. What is the smallest possible value for a where $y = \sin 2a$ reaches its maximum?

A. $\frac{\pi}{4}$

B. $\frac{\pi}{2}$

C. π

D. 2π

E. 4π

46. Let $x = 3y - 4z + 7$. What happens to the value of x if the value of y decreases by 2 and the value of z is increased by 1?

F. It increases by 3.

G. It increases by 5.

H. It decreases by 1.

J. It decreases by 10.

K. It is unchanged.

DO YOUR FIGURING HERE.**GO ON TO THE NEXT PAGE.**

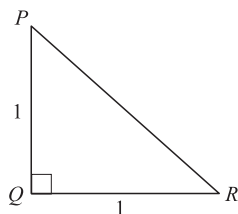
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47. Which of the following represents the values of x that are solutions for the inequality $(x - 1)(4 - x) < 0$?

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

DO YOUR FIGURING HERE.

48. In the figure below, triangle PQR is an isosceles right triangle. What is the ratio of the hypotenuse to the length of PQ ?



- F. $\frac{\sqrt{2}}{2}:1$
 G. $\frac{\sqrt{3}}{3}:1$
 H. $\sqrt{2}:1$
 J. $\sqrt{3}:1$
 K. $2\sqrt{2}:1$
49. If $\tan x = \frac{3}{4}$ and $0^\circ \leq x^\circ \leq 90^\circ$, then $\cos x = ?$

- A. $\frac{5}{3}$
 B. $\frac{4}{3}$
 C. $\frac{5}{4}$
 D. $\frac{4}{5}$
 E. $\frac{3}{5}$

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50. For all $a \neq 0$ and $b \neq 0$, $\frac{a+b}{b(a+b)-2a(a+b)} = ?$

F. $\frac{1}{b-2}$

G. $\frac{1}{2ab}$

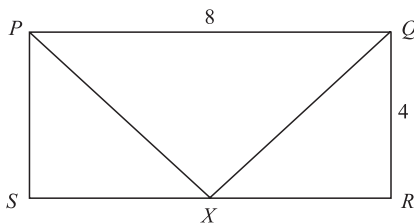
H. $\frac{1}{a+b}$

J. $\frac{1}{b-2a}$

K. $-\frac{1}{2b}$

DO YOUR FIGURING HERE.

51. In the figure below, $PQRS$ is a rectangle with sides of lengths shown. X is the midpoint of \overline{SR} . What is the perimeter of triangle PXQ ?



- A. 10
 B. $4\sqrt{2} + 12$
 C. $3\sqrt{2} + 12$
 D. $8\sqrt{2} + 8$
 E. $4\sqrt{2} + 4$
52. A line in the standard (x,y) coordinate plane has a slope of $\frac{2}{3}$ and passes through points $(3,4)$ and $(t,-2)$. What is the value of t ?
- F. 3
 G. 2
 H. 0
 J. -2
 K. -6
53. José is building a scale model of a sailboat, complete with a main sail. The actual sailboat's main sail measures 56 feet high with a base of 32 feet. If the model sailboat's main sail has a base of 8 inches, how tall will the model's main sail be, in inches?
- A. 14
 B. 28
 C. 32
 D. 56
 E. 112

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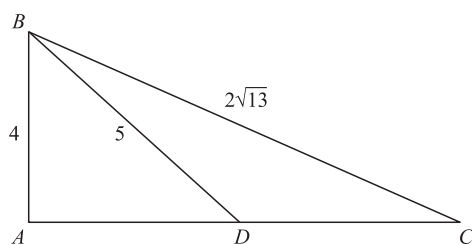
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54. What values of x make the inequality $-5x - 7 > 3x + 1$ true?

F. $x > 1$
 G. $x < 8$
 H. $x < -1$
 J. $x > -4$
 K. $x < 2$

DO YOUR FIGURING HERE.

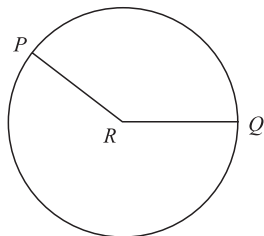
55. In the figure below, the lengths of the sides of triangle BAC are as shown. \overline{BD} bisects side \overline{AC} . What is the length of DC ?



- A. $\sqrt{3}$
 B. 2
 C. 3
 D. $2\sqrt{5}$
 E. 4
56. Which of the following intervals contains the solution to the equation $x - 2 = \frac{2x + 5}{3}$?

F. $-6 < x < 11$
 G. $11 \leq x < 15$
 H. $6 < x \leq 10$
 J. $-5 < x \leq -3$
 K. $-11 \leq x \leq -2$

57. In the figure below, P and Q lie on the circle R , which has a radius of 9. If the angle PRQ is 120° , what is the area of sector PRQ ?



A. 3π
 B. 9π
 C. 27π
 D. 81π
 E. 243π

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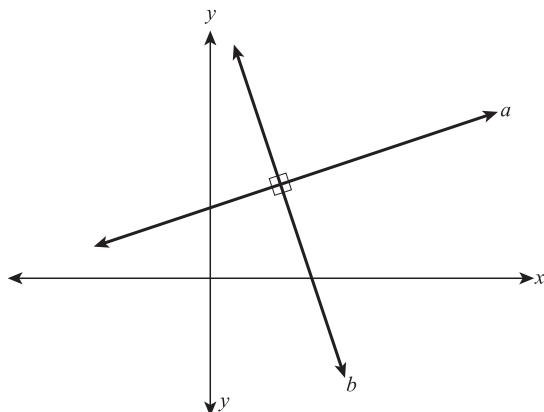
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58. Given the graph below in the standard (x,y) coordinate plane, the slope of line a is m_a and the slope of line b is m_b . Which of the following statements about the slope of lines a and b is true?

DO YOUR FIGURING HERE.



- F. $m_a = \frac{-1}{m_b}$
- G. $m_a + m_b = 0$
- H. $-\frac{1}{2}m_a = m_b$
- J. $m_a - 1 = m_b$
- K. $m_a - m_b = 0$
59. If $\cos x = \frac{5}{7}$ and $\tan x = \frac{4}{5}$, what is $\sin x$?

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

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60. A total of f men went on a fishing trip. Each of the r boats that were used to carry the fishermen could accommodate a maximum number of m passengers. If one boat had 5 open spots and the remaining boats were filled to capacity, which of the following expresses the relationship among f , r , and m ?

F. $rm + 5 = f$

G. $rm - 5 = f$

H. $r + m + 5 = f$

J. $rf = m + 5$

K. $rf = m - 5$

DO YOUR FIGURING HERE.

END OF THE MATHEMATICS TEST.

STOP! IF YOU HAVE TIME LEFT OVER, CHECK YOUR WORK ON THIS SECTION ONLY.

Mathematics Test

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