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MATHEMATICS TEST

60 MINUTES—60 QUESTIONS

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. If $3x - 5 = 7$, then $3x = ?$

   A. $\frac{2}{3}$

   B. $\frac{4}{3}$

   C. 4

   D. $\frac{22}{3}$

   E. 12

2. What is the complement of 70°?

   F. 10°
   G. 20°
   H. 30°
   J. 80°
   K. 110°

3. 70 is 10% of what number?

   A. 7
   B. 63
   C. 77
   D. 700
   E. 7,000

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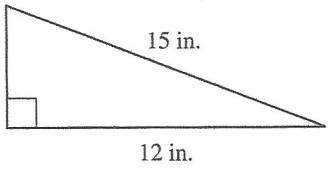
DO YOUR FIGURING HERE.

4. The sum of three consecutive integers is 99. What is the value of the greatest of the three integers?

   F. 32
   G. 33
   H. 34
   J. 35
   K. 36

5. What is the area of the figure below?

   A. 54 in^2
   B. 90 in^2
   C. 108 in^2
   D. 135 in^2
   E. 180 in^2



6. Last week Dyson earned $8 per hour working at the local grocery store. This week his boss gave him a 10% raise. If he works 20 hours this week, what will his gross income be before taxes?

   F. $160
   G. $162
   H. $174
   J. $176
   K. $180

7. Which of the following inequalities is equivalent to $3 - 4(x + 7) < 19$?

   A. $x > \frac{9}{2}$
   B. $x < \frac{9}{2}$
   C. $x < -11$
   D. $x > -11$
   E. $x < 11$

8. Which of the following is equivalent to $3\sqrt{300} - 5\sqrt{75}$?

   F. $-2\sqrt{225}$
   G. $5\sqrt{3}$
   H. $15\sqrt{3}$
   J. $2\sqrt{225}$
   K. $15\sqrt{225}$

9. $|-2 + 3^2| - |-2 - 3^2| = ?$

   A. –24
   B. –4
   C. 0
   D. 18
   E. 26

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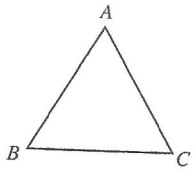
DO YOUR FIGURING HERE.

10. For triangle ABC, $m\angle A = 75°$ and $m\angle B = 36°$. Which segment of triangle ABC is the longest?

F. AB
G. BC
H. AC
J. AB and AC are both the longest sides.
K. Not enough information



11. Which of the following is a factor of $3x^2 + x - 4$?

A. $(x + 2)$
B. $(x - 2)$
C. $(3x - 4)$
D. $(x + 1)$
E. $(x - 1)$

12. Which of the following equations passes through the point $(-3, 5)$?

F. $y = -2x - 3$
G. $y = -4x + 5$
H. $y = -x + 2$
J. $y = 4x + 5$
K. $y = 5x + 9$

13. If $f(x) = \frac{-x^2 + 4}{x}$, then $f(-2) = ?$

A. -4
B. -1
C. 0
D. 6
E. 10

14. Which of the following equations is parallel to $y = -\frac{3}{4}x + 2$ in the standard (x, y) coordinate plane?

F. $y = -\frac{3}{4}x$
G. $y = \frac{4}{3}x + 2$
H. $y = -\frac{4}{3}x + 2$
J. $y = \frac{3}{4}x + 2$
K. $x = -\frac{3}{4}y + 2$

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DO YOUR FIGURING HERE.

15. An aquarium has exactly two types of fish: goldfish and angelfish. If the ratio of goldfish to angelfish is 2:5 and there are 25 angelfish in the aquarium, how many total fish are in the aquarium?

A. 7
B. 32
C. 35
D. 50
E. 125

16. Three different lines in the same plane can intersect at how many points?

F. 1
G. 1 or 2
H. 1 or 3
J. 1, 2, or 3
K. 0, 1, 2, or 3

17. If $-1 < a < 0$, $-3 < b < -4$, and $c = a - b$, then which of the following statements is true?

A. $c < a$
B. $c < b$
C. $c < a + b$
D. $c < 0$
E. $c > 0$

18. What is the slope between the points (–2, 5) and (0, 8)?

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

19. Rosemary and Caroline are baking cupcakes for a party. They are working from a recipe that will make 32 cupcakes. The recipe requires $2\frac{1}{2}$ cups of sugar to make 1 full batch. If they need to make 250 cupcakes for the party, which of the following amounts is the LEAST amount of sugar they need to make all 250 cupcakes?

A. 5 cups
B. 10 cups
C. 15 cups
D. 20 cups
E. 25 cups

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DO YOUR FIGURING HERE.

20. For the following triangle, what is the value of sin (C) ?

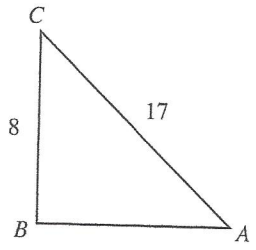
F. $\frac{8}{17}$

G. $\frac{15}{17}$

H. $\frac{\sqrt{353}}{17}$

J. $\frac{17}{15}$

K. $\frac{17}{8}$

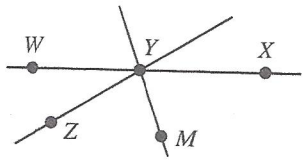


21. If $5^3 \cdot 5^{-7} = \frac{1}{5^x}$, then $x = ?$

A. –21
B. –4
C. 4
D. 7
E. 21

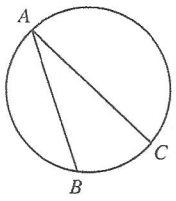
22. In the figure below, $m\angle WYZ = 28°$ and $\overline{YM}$ bisects $\angle ZYX$. Which of the following is the measure of $\angle XYM$?

F. 76°
G. 78°
H. 84°
J. 90°
K. 152°



23. In the figure below, $\overline{AC}$ is a diameter of the circle and $m\angle BAC = 35°$. Find the measure of arc $\overset{\frown}{AB}$.

A. 35°
B. 60°
C. 70°
D. 90°
E. 110°



24. Which of the following is the greatest common factor of $36m^4n^3p^5$ and $24m^2n$?

F. $6m^2n$
G. $6m^4n^3p^5$
H. $12m^2n$
J. $12m^2np^5$
K. $72m^2n$

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DO YOUR FIGURING HERE.

25. Dave drove 144 miles to see his favorite band in concert. The drive to the concert took exactly 3 hours. On the drive home, Dave drove 10 miles per hour faster than he drove to the concert. Approximately how long did the return trip take?

A. 2.2 hours
B. 2.5 hours
C. 2.7 hours
D. 2.9 hours
E. 3 hours

26. What value of x will satisfy the following matrix equation?

$$\begin{bmatrix} 23y^2 & 13z \\ 2x-1 & -15w^3 \end{bmatrix} + \begin{bmatrix} -7 & 10 \\ -4x-2 & 13 \end{bmatrix} = \begin{bmatrix} 16 & 23 \\ 12 & -2 \end{bmatrix}$$

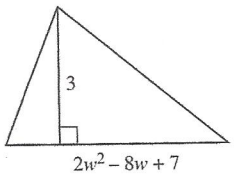
F. −7.5
G. −3.5
H. 1
J. 6.5
K. 13

27. Paxton leaves his house at noon heading due east for 4 miles. He then turns and heads directly south for 6 miles until he reaches the marina. What is the straight-line distance from Paxton's house to the marina?

A. $2\sqrt{2}$
B. 7
C. $2\sqrt{13}$
D. 10
E. $4\sqrt{13}$

28. Which of the following is an expression for the area of the triangle below?

F. $2w^2 - 8w + 10$
G. $\frac{6w^2 - 24w + 21}{2}$
H. $6w^2 - 24w + 21$
J. $12w^2 - 48w + 42$
K. $(2w - 7)(w + 3)$



29. What is the difference in the measure of one interior angle and one exterior angle of a regular decagon?

A. 36°
B. 64°
C. 108°
D. 144°
E. 180°

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DO YOUR FIGURING HERE.

30. For ΔABC, what is the value of $\tan(A) - \cos(C)$?

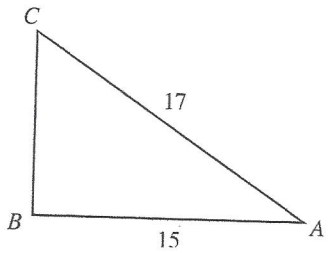
F. $-\frac{89}{255}$

G. $-\frac{16}{255}$

H. 0

J. $\frac{16}{255}$

K. $\frac{89}{255}$



31. If $\forall$ is defined for all real numbers x and y by $x \forall y = (x + y)(x - y)$, then $1 \forall (2 \forall 2) = ?$

A. 0
B. 1
C. 3
D. 4
E. 5

32. Sophie has played 6 games of soccer scoring 0, 1, 3, 2, 4, and 1 goals respectively in those games. For game 7, which of the following values will NOT yield a median of 2 goals scored?

F. 1 goal
G. 2 goals
H. 3 goals
J. 4 goals
K. 5 goals

33. What is the center of the circle with equation $(x + 7)^2 + (y - 5)^2 = 121$?

A. (–7, –5)
B. (–7, 5)
C. (7, –5)
D. (7, 5)
E. (5, 11)

34. Given the equation $3x - 7y = 21$, what is the equation in slope-intercept form?

F. $y = -\frac{3}{7}x + 3$

G. $y = -\frac{7}{3}x + 3$

H. $y = -\frac{3}{7}x - 3$

J. $y = \frac{3}{7}x + 3$

K. $y = \frac{3}{7}x - 3$

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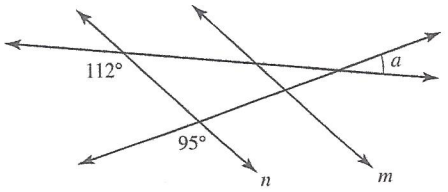
DO YOUR FIGURING HERE.

35. In the graph below, line m is parallel to line n. Find the value of a.

A. 17°
B. 68°
C. 85°
D. 95°
E. 112°



36. Which of the following is the set of solutions to the inequality $-\frac{2}{3}x + 5 < -\frac{1}{3}(2x + 9)$?

F. $x < 6$
G. $x > -6$
H. $x > 6$
J. There is no solution.
K. The set of all real numbers

37. Given the equation $-\frac{3}{5}x + 6y = 18$, which of the following equations is perpendicular to the given equation?

A. $y = \frac{1}{10}x + 2$
B. $y = \frac{5}{3}x + 7$
C. $y = \frac{3}{5}x + 5$
D. $y = -10x + 1$
E. $y = 10x + 18$

38. Dustin is in a 40-foot air traffic control tower at the local airport. He spots a plane that has just landed and using his protractor measures the angle of depression from the top of the tower to the landed plane to be 12°. How far from the base of the control tower is the plane?

F. $\frac{\tan(12°)}{40}$
G. $\frac{40}{\tan(12°)}$
H. $\frac{\sin(12°)}{40}$
J. $\frac{40}{\sin(12°)}$
K. $\frac{\cos(12°)}{40}$

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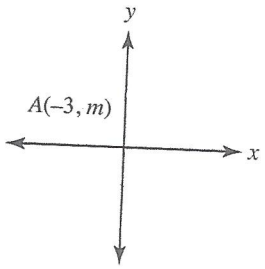
DO YOUR FIGURING HERE.

39. For what values of x is the function $\sqrt{x-5}$ undefined in the real number system?

A. $x = 0$
B. $x = 5$
C. $x = -5$
D. $x < 5$
E. $x > 5$

40. In the standard (x, y) coordinate plane, what are the coordinates of point A after the graph is reflected over the line $x = 7$?



F. $(3, m)$
G. $(-3, -m)$
H. $(10, m)$
J. $(15, m)$
K. $(17, m)$

41. Given line segment AB with $A(-3, 2)$ and $B(5, 8)$, which of the following is the length of AB?

A. $\sqrt{34}$
B. $2\sqrt{10}$
C. 10
D. $9\sqrt{2}$
E. $\sqrt{170}$

42. Given similar rectangles $QUAD$ and $RECT$, the ratio of sides QU to RE is 1:4. If the area of $QUAD$ is 12, what is the area of $RECT$?

F. 0.75
G. 3
H. 12
J. 48
K. 192

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DO YOUR FIGURING HERE.

Use the following table to answer questions 43–44.

Forty students were asked to name their favorite pet. The following table lists the results.

Dog	16
Cat	15
Bird	9

43. Erick wants to make a circle graph from the given information. What would be the central angle for the dog piece of the graph?

A. 16°
B. 135°
C. 144°
D. 154°
E. 180°

44. When Erick recounted the votes later, he realized 3 of the votes that had actually been cast for cats got recorded as votes for dogs. What is the difference between the original percent of votes cast for cats and the corrected percent of votes for cats?

F. 2.5%
G. 7.5%
H. 15%
J. 37.5%
K. 45%

45. A parking lot downtown charges x dollars for the first hour and y dollars for each hour after the first. If Daniel parks in the lot for h hours where $h > 6$, which of the following equations represents P, the amount Daniel has to pay to park in the lot?

A. $P = h(x + y)$
B. $P = x + yh$
C. $P = y + x(h - 1)$
D. $P = xh + y(h - 1)$
E. $P = x + y(h - 1)$

46. Let $y = \frac{2x}{3z}$. What happens to the value of z as both x and y are doubled?

F. z remains the same
G. z doubles
H. z decreases by $\frac{1}{2}$
J. z quadruples
K. z decreases by a factor of $\frac{1}{4}$

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DO YOUR FIGURING HERE.

47. If $\frac{w^6 t^5}{m^9} > 0$, then which of the following is true?
    - **A.** $w > 0$
    - **B.** $t > 0$
    - **C.** $m > 0$
    - **D.** $wt > 0$
    - **E.** $tm > 0$

48. Which of the following is equivalent to $2\log(x) + \frac{1}{2}\log(y) - 4\log(z)$?
    - **F.** $\log\left(2x + \frac{1}{2}y - 4z\right)$
    - **G.** $\log\left(x^2 z^4 \sqrt{y}\right)$
    - **H.** $\log\left(\frac{x^2\sqrt{y}}{z^4}\right)$
    - **J.** $\log\left(\frac{xy}{4z}\right)$
    - **K.** $\log\left(2x^2yz\right)$

49. Given the following table, find $f(g(2))$:

x	$f(x)$	$g(x)$
1	−5	0
2	−10	3
3	−15	6
4	−20	9

    - **A.** −15
    - **B.** −10
    - **C.** 0
    - **D.** 3
    - **E.** 6

50. The number of fish, p, a small pond can sustain varies inversely with the square root of the amount of predators, q, in the pond. If a pond with 49 predators can sustain a population of 800 fish, how many fish could a pond with 100 predators sustain?
    - **F.** 560
    - **G.** 600
    - **H.** 650
    - **J.** 1,600
    - **K.** 2,000

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DO YOUR FIGURING HERE.

51. Points $P(1, 1)$ and $Q(x, x^2)$ lie in the standard (x, y) coordinate plane. Which of the following is an expression for the slope between points P and Q when $x > 5$?

A. 0
B. $\frac{x^2+1}{x+1}$
C. $x + 1$
D. $\frac{x+1}{x^2+1}$
E. Undefined

52. Which of the following expressions is equivalent to $\frac{3 \cdot 3^{2x-5}}{3^{x+1}}$?

F. 3^{x-7}
G. 3^{x-5}
H. 3^{x-3}
J. 3^{x-1}
K. 1

53. What fraction is located exactly halfway between $\frac{3}{8}$ and $\frac{4}{5}$ on the standard number line?

A. $\frac{15}{40}$
B. $\frac{17}{40}$
C. $\frac{1}{2}$
D. $\frac{7}{13}$
E. $\frac{47}{80}$

54. Mike has taken 4 tests in algebra so far. His average after 4 tests is 85%. If he has not received a grade lower than 80% on any tests, what is the highest possible score Mike could have achieved on one test?

F. 96%
G. 97%
H. 98%
J. 99%
K. 100%

55. Given $|x - 3| > x - 3$, what is the solution set for the inequality?

A. $x > 3$
B. $x < 3$
C. $x > 0$
D. $x < 0$
E. All real numbers

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DO YOUR FIGURING HERE.

56. Which of the following is equivalent to $\frac{i+7}{i-5} \cdot i$?

F. -1

G. $\frac{6}{13} - \frac{17}{13}i$

H. $\frac{6}{13} + \frac{17}{13}i$

J. $-\frac{1}{2} - \frac{3}{2}i$

K. $\frac{1}{2} + \frac{3}{2}i$

57. One square inch on the average pizza contains 50 calories. Alex bakes a 12″ diameter pizza and cuts it into 8 equal slices. If his dad eats 3 slices and Alex only eats 2, approximately how many more calories did Alex's dad eat than he did?

A. 100
B. 700
C. 1,400
D. 2,100
E. 2,200

58. Given $\tan(\theta) = v$ where $0° \leq \theta \leq 90°$, which of the following could be an expression for $\cos(\theta)$?

F. $\frac{v}{\sqrt{1+v^2}}$

G. $\frac{\sqrt{1+v^2}}{v}$

H. $\frac{1}{\sqrt{1+v^2}}$

J. $\sqrt{1-v^2}$

K. $\frac{\sqrt{1-v^2}}{v}$

59. Lisa, Carl, Max, Jenny, and Andy go to watch a movie and all sit next to each other in the same aisle. Andy must sit at either end of the group, but everyone else can sit anywhere within the group. How many possible seating arrangements are there?

A. 15
B. 48
C. 56
D. 92
E. 120

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DO YOUR FIGURING HERE.

60. In the standard (x, y) coordinate plane, points (m, n) and $(m-2, n+\frac{2}{g})$ lie on the graph of the equation $y=\frac{1}{3}x-t$, where $t>1$. What is the value of g?

F. -3
G. $-\frac{1}{4}$
H. 1
J. $\frac{7}{5}$
K. $\frac{123}{5}$

STOP

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

Answer Key

PRACTICE TEST 3

English Test

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

Math Test

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