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MATHEMATICS TEST

60 MINUTES—60 QUESTIONS

Directions: After solving each problem, darken the appropriate space on the answer sheet. Do not spend too much time on any one problem. Make a note of the ones that seem difficult, and return to them when you finish the others. Assume that the word *line* means "straight line," that geometric figures are not necessarily drawn to scale, and that all geometric figures lie in a plane.

DO YOUR FIGURING HERE

1. Which of the following is not a real number?

   A. $\frac{0}{5}$

   B. $-\sqrt{23}$

   C. $\frac{12}{\sqrt{6}}$

   D. $\frac{8}{2-2}$

   E. π

2. What is the value of $7^2 - 2[3 + 2(5 - 1)]$?

   F. 9
   G. 940
   H. 27
   J. –8
   K. –9

3. What is the solution set of $2x - 5 = 7 - 4x$?

   A. $\{1\}$

   B. $\{2\}$

   C. $\left\{\frac{1}{2}\right\}$

   D. $\{-2\}$

   E. $\left\{\frac{-1}{3}\right\}$

4. What percent of 24 is 18?

   F. 75%
   G. 150%
   H. 25%
   J. $33\frac{1}{3}\%$
   K. $133\frac{1}{3}\%$

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5. How many curtains can be made from 20 meters of cloth if each curtain requires $2\frac{1}{2}$ meters?

   A. 50
   B. 20
   C. 12
   D. 8
   E. 4

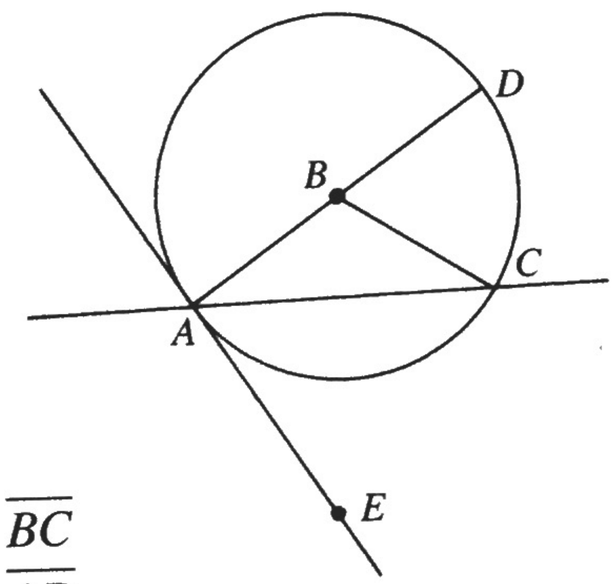
6. What is the simplified form of $2x - \{3x - 2[x - (1 - x)]\}$?

   F. $3x - 2$
   G. $-x - 2$
   H. $-4x - 1$
   J. $-x + 2$
   K. $3x - 2x^2$

7. Which of the following numbers is NOT prime?

   A. 43
   B. 51
   C. 73
   D. 97
   E. 101

8. Which of the following is a secant line?



   F. Segment $\overline{BC}$
   G. Segment $\overline{AD}$
   H. Line $\overleftrightarrow{AC}$
   J. Line $\overleftrightarrow{AE}$
   K. Segment $\overline{AB}$

9. If $x = -2$ and $y = 3$, then $-x - xy^2 = ?$

   A. 16
   B. –34
   C. –38
   D. 20
   E. 144

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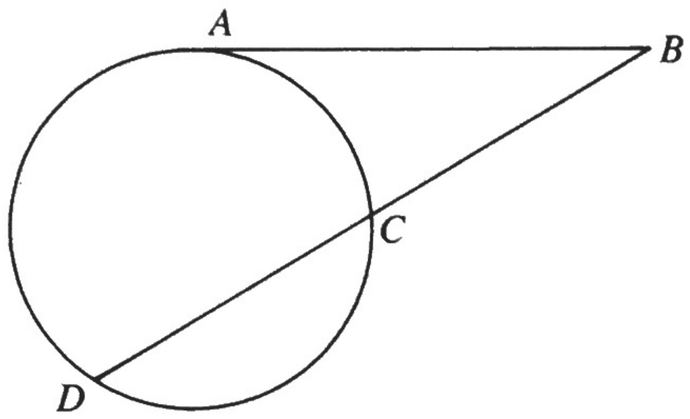
10. In the circle shown, $\overline{AB}$ is a tangent and $\overline{BD}$ is a secant. If the length of $\overline{AB}$ is 6 and the length of $\overline{BC}$ is 4, what is the length of $\overline{CD}$?



F. $2\sqrt{5}$
G. 8
H. $2\frac{2}{3}$
J. 5
K. 10

11. What is an equivalent expression, in simplest radical form, to $\sqrt[3]{4ab^2}\ \sqrt[3]{12a^4b^2}$?

A. $2ab\sqrt[3]{6a^2b}$
B. $\sqrt[3]{48a^5b^4}$
C. $\sqrt[6]{48a^5b^4}$
D. $16a^2b$
E. None of these

12. Which of the following is NOT a quadratic equation in one variable?

F. $3x^2 + 5 = 5x + 7$
G. $x(2x + 5) = 8$
H. $3^2 + 5x = 4^2 + 2x$
J. $x^2 = 16$
K. $(2x - 3)^2 = 5$

13. What is the simplified form of the expression $(3x - 1)^2$?

A. $9x^2 - 1$
B. $9x^2 - 6x + 1$
C. $9x^2 + 1$
D. $9x^2 + 6x + 1$
E. $9x + 1$

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DO YOUR FIGURING HERE

14. If 2 less than five times a certain number is 1 more than twice the same number, which equation can be used to find the number?

F. $5(x - 2) = 2(x + 1)$
G. $5x + 1 = 2x - 2$
H. $2 - 5x = 1 + 2x$
J. $5x - 2 = 2x + 1$
K. $5(x - 2) = 2x + 1$

15. The diameter of a circle is one side of a triangle, and the third vertex is on the circle. What kind of triangle is formed?

A. Isosceles
B. Right
C. Acute
D. Scalene
E. Equilateral

16. Which of the following is equivalent to $|x - 1| \leq 3$?

F. $x \leq 4$
G. $x + 1 \leq 3$
H. $-2 \leq x \leq 4$
J. $x \leq -2$ or $x \geq 4$
K. $x \leq -2$ and $x \geq 4$

17. In the rectangular coordinate system, the point associated with the ordered pair $(-4, 0)$ is located in which quadrant?

A. I
B. II
C. III
D. IV
E. None of these

18. Which of the following ordered pairs satisfies the equation $3x - 2y = 5$?

F. $(-1, -1)$
G. $(1, 1)$
H. $(1, -1)$
J. $(-1, 1)$
K. $(5, -5)$

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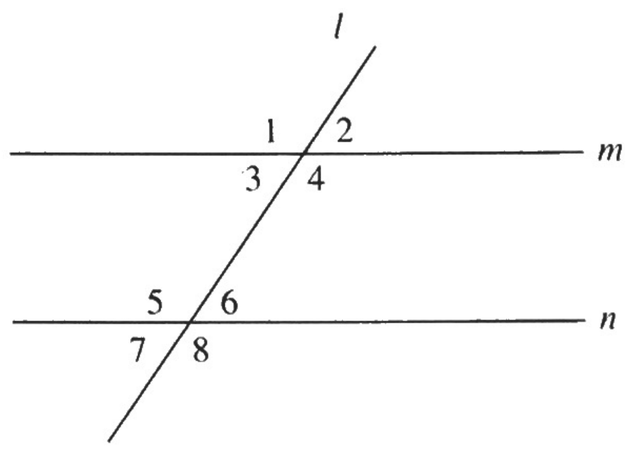
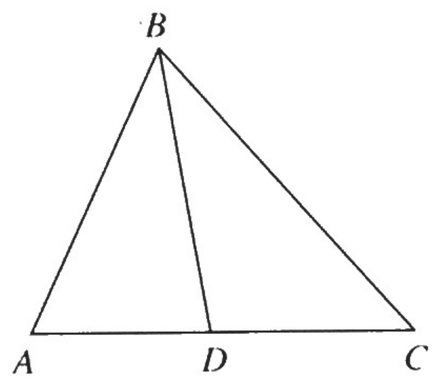
19. In the diagram, lines m and n in a plane are cut by transversal l. Which statement would allow the conclusion that $m \parallel n$?



A. m ∠ 2 = m ∠ 3
B. m ∠ 2 = m ∠ 6
C. m ∠ 5 = m ∠ 3
D. m ∠ 2 + m ∠ 4 = 180
E. m ∠ 1 = m ∠ 7

20. If, in $\triangle ABC$, $\overline{BD}$ is drawn so that $AD = DC$, then what is BD?



F. An angle bisector
G. An altitude
H. A median
J. A perpendicular bisector of $\overline{AC}$
K. A transversal

21. What is the sum of the fractions $\frac{5}{12}$ and $\frac{7}{18}$?

A. $\frac{3}{5}$

B. $\frac{29}{36}$

C. $\frac{1}{35}$

D. $\frac{1}{18}$

E. $\frac{2}{5}$

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22. When completely simplified,

$$\frac{2}{3} - \frac{2 - \frac{5}{6}}{2^3 - 1} \div \frac{1}{2} = ?$$

F. $\frac{1}{3}$

G. 1

H. $\frac{7}{12}$

J. $\frac{-32}{15}$

K. $\frac{5}{18}$

23. What is the value of $\log_3 27$?

A. 3

B. 9

C. $\frac{1}{3}$

D. $\frac{1}{9}$

E. 24

24. If $\sin \theta = \frac{1}{2}$, then $\cos \theta = ?$

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

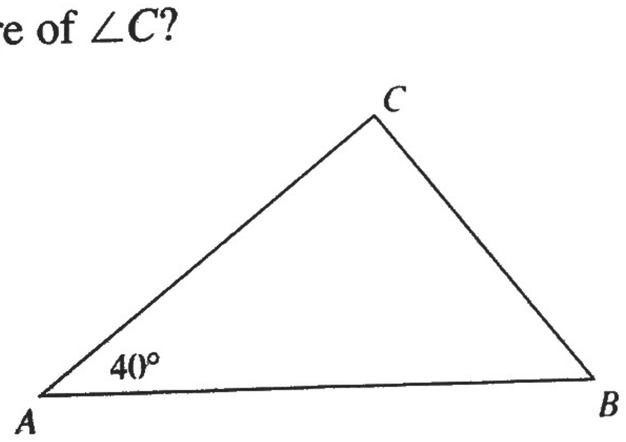
G. $\frac{-1}{2}$

H. $\frac{\sqrt{3}}{2}$

J. $\frac{-\sqrt{3}}{2}$

K. $\frac{\pm\sqrt{3}}{2}$

25. In $\triangle ABC$, the length of $\overline{AC}$ is equal to the length of $\overline{BC}$. If the measure of $\angle A$ is 40°, what is the measure of $\angle C$?



A. 50°
B. 60°
C. 80°
D. 100°
E. 140°

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DO YOUR FIGURING HERE

26. Which is the largest of the following numbers?

F. 3.1415926
G. $\frac{22}{7}$
H. 3.14
J. 3.1416
K. All these numbers are equal.

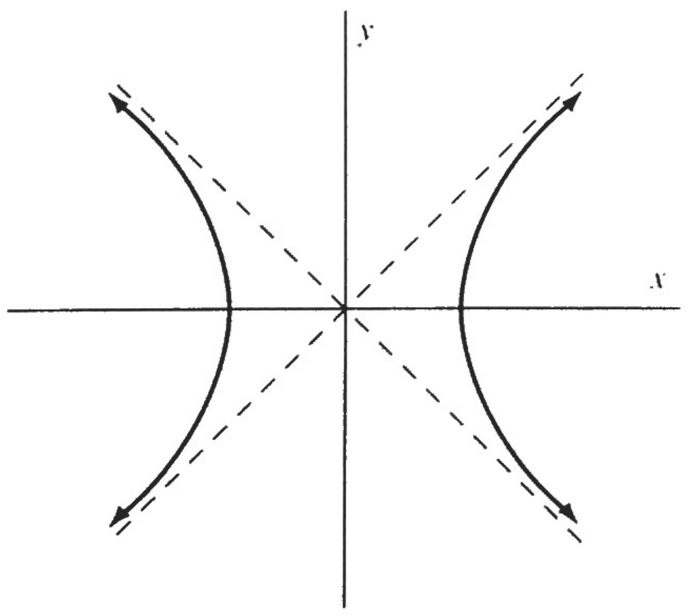
27. If Joan's English assignment is to read 80 pages, and she has read $\frac{4}{5}$ of her assignment, how many pages does she have left to read?

A. 16
B. 20
C. 32
D. 48
E. 64

28. Which of the following is a pure imaginary number?

F. -4
G. $-\sqrt{4}$
H. $\sqrt{-4}$
J. $3 + 2i$
K. 8

29. Which equation corresponds to the accompanying graph?



A. $x^2 - y^2 = 1$
B. $x^2 + y^2 = 1$
C. $x^2 + y = 1$
D. $x - y^2 = 1$
E. $x + y^2 = 1$

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DO YOUR FIGURING HERE

30. What is the solution set of the following system of equations?

$$\begin{pmatrix} 2x+y=-1 \\ 3x-2y=-19 \end{pmatrix}$$

F. $\{(2,-5)\}$
G. $\{(-3,5)\}$
H. $\{(-7,-1)\}$
J. There is no solution.
K. There are infinitely many solutions.

31. What is the solution to this system of equations?

$$\begin{pmatrix} 5x-2y=3 \\ y=4x-3 \end{pmatrix}$$

A. $\{1\}$
B. $\{(1,1)\}$
C. $\{(-1,-7)\}$
D. $\{(-1,-1)\}$
E. None of these

32. Which expression would be appropriate to complete the following equation in order for the equation to illustrate the identity property of addition:
$5 + (7 + 0) = ?$

F. $(7 + 0) + 5$
G. $5 + (0 + 7)$
H. $(5 + 7) + 0$
J. $5 + 7$
K. 12

33. If $a < b$, then $|a - b| + a + b = ?$

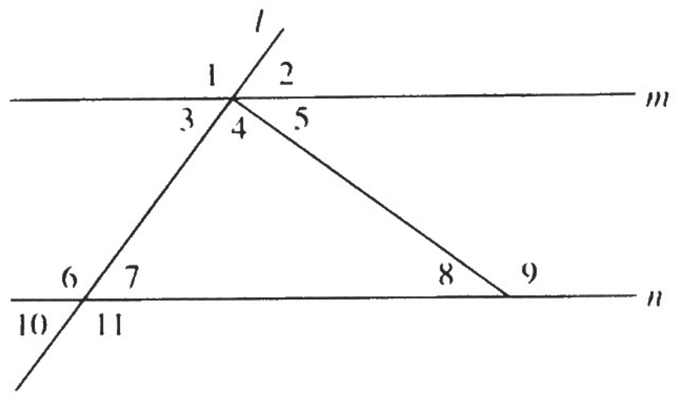
A. 0
B. $2a$
C. $2b$
D. $2a + 2b$
E. $a - b$

34. What is the set of prime factors of 6,440?

F. $\{2, 5, 161\}$
G. $\{2, 7, 23\}$
H. $\{2, 5, 7, 23\}$
J. $\{2, 5, 7\}$
K. $\{2, 3, 220\}$

DO YOUR FIGURING HERE

35. Which of the angles below are supplementary?



A. $\angle 6$ and $\angle 11$
B. $\angle 3$, $\angle 4$, and $\angle 5$
C. $\angle 3$ and $\angle 7$
D. $\angle 8$ and $\angle 9$
E. $\angle 2$ and $\angle 7$

36. $13\frac{1}{4} - 7\frac{5}{8} = ?$

F. $5\frac{5}{8}$

G. $5\frac{7}{8}$

H. $6\frac{3}{8}$

J. $6\frac{1}{2}$

K. 5

37. What is the degree of the polynomial $3x^2y^3 + 5xy^2 - 7y$?

A. 0
B. 2
C. 5
D. 8
E. 9

38. What is the sum of the roots of $4x^2 + 3x - 8 = 0$?

F. $\frac{-4}{3}$

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

H. 2

J. $\frac{-3}{4}$

K. $\frac{3}{8}$

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39. What is the value of $16^{-3/4}$?

A. This is undefined.
B. 8
C. $\frac{1}{8}$
D. –8
E. $\frac{-1}{8}$

40. Which of the following is not a conic section?

F. Circle
G. Parabola
H. Hyperbola
J. Exponential curve
K. Ellipse

41. The trigonometric function sin 215° is equal to which of the following?

A. sin 35°
B. – cos 35°
C. – cos 55°
D. – sin 55°
E. sin 55°

42. In how many orders can 6 different books be placed on a shelf?

F. 1
G. 6
H. 12
J. 36
K. 720

43. What is the value of -2^{-2}?

A. 4
B. – 4
C. $\frac{1}{4}$
D. $\frac{-1}{4}$
E. None of these

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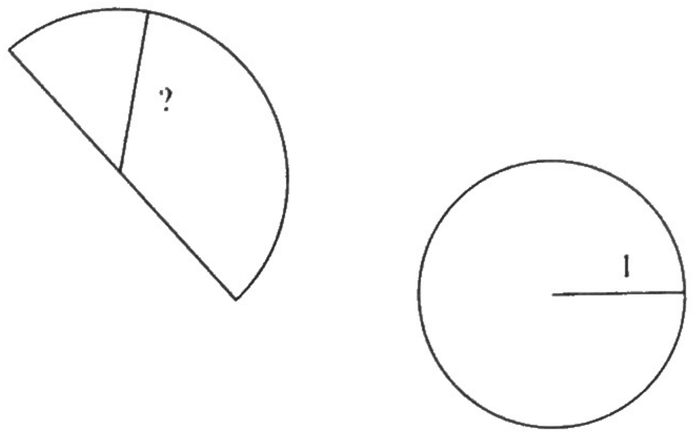
44. A circle and a semicircle have the same area. If the circle has radius 1, what is the radius of the semicircle?



F. 2
G. 4
H. $\sqrt{2}$
J. $\pi\sqrt{2}$
K. 2π

45. What is the center of the circle whose equation is $x^2 + y^2 + 4x - 18y + 69 = 0$?

A. (–2, 9)
B. (2, – 9)
C. (4, –18)
D. (– 4, 18)
E. (0,0)

46. What is the distance between (5, 3) and (–2, 4)?

F. $\sqrt{38}$
G. $2\sqrt{10}$
H. $\sqrt{58}$
J. $5\sqrt{2}$
K. $\sqrt{10}$

47. What is the smallest positive angle that is co-terminal with 846°?

A. 234°
B. 126°
C. 36°
D. 54°
E. –234°

48. If a student received a score of 80% on a test in which 60 questions were answered correctly, how many questions were on the test?

F. 15
G. 30
H. 48
J. 75
K. 90

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DO YOUR FIGURING HERE

49. $7(10^4) + 3(10^3) + 2(10^1) + 9(10^0)$ is the expanded form of what number?

A. 7,329
B. 70,329
C. 73,029
D. 73,209
E. 7302.9

50. What is the probability of getting a sum of 8 on one roll of a fair pair of dice?

F. 5

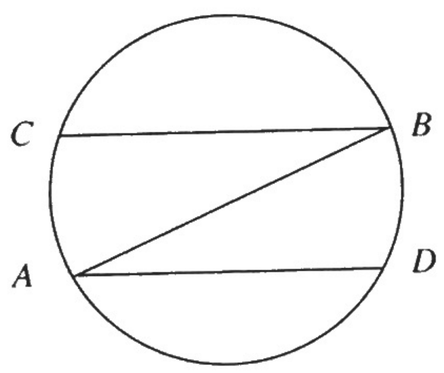
G. 36

H. $\frac{5}{36}$

J. $\frac{1}{5}$

K. $\frac{1}{8}$

51. If $\overline{AB}$ is a diameter, $\overline{AD} \parallel \overline{BC}$, and $m\angle BAD = 15°$, what is the measure of arc $\overset{\frown}{BC}$?



A. 180°
B. 165°
C. 90°
D. 75°
E. None of these

52. What is the period of the function $y = 3 \sin 5\left(x + \frac{\pi}{12}\right)$?

F. 3

G. 5

H. $-\frac{\pi}{12}$

J. $\frac{2\pi}{5}$

K. $\frac{\pi}{5}$

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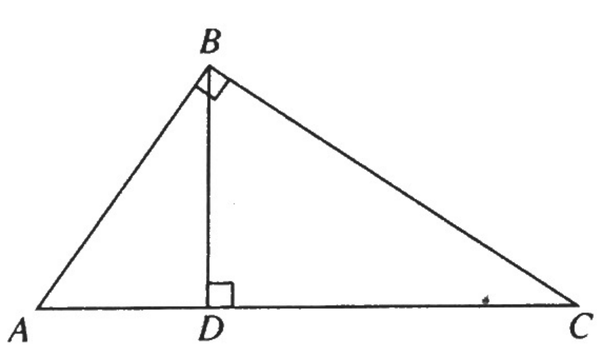
53. What is the y-intercept of the graph of $y = x^2 - 2x - 8$?

A. –8
B. 8
C. 4 and –2
D. –4 and 2
E. There are no y-intercepts.

54. What is the slope of the line whose equation is $2x - 5y = 7$?

F. –2
G. –5
H. $\frac{5}{2}$
J. $\frac{2}{5}$
K. 2

55. In right triangle ABC ($\angle B$ is the right angle), altitude $\overline{BD}$ is drawn. If $AB = 4$ and $AD = 3$, what is the length of $\overline{AC}$?



A. 3
B. 4
C. $\frac{9}{4}$
D. 12
E. $\frac{16}{3}$

56. What is the sum of the interior angles of a hexagon?

F. 360°
G. 540°
H. 720°
J. 900°
K. 1,080°

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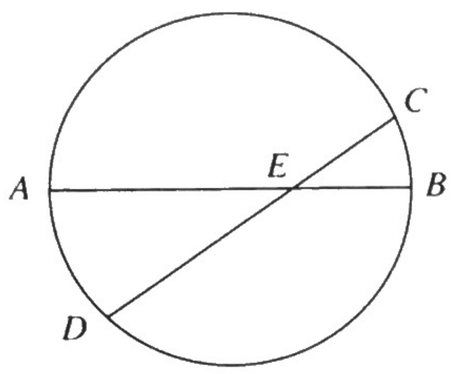
DO YOUR FIGURING HERE

57. If $\overline{AB}$ is a diameter, m $\angle CEB = 50°$, and m $\overset{\frown}{BC} = 20°$, what is the measure of $\overset{\frown}{DB}$?

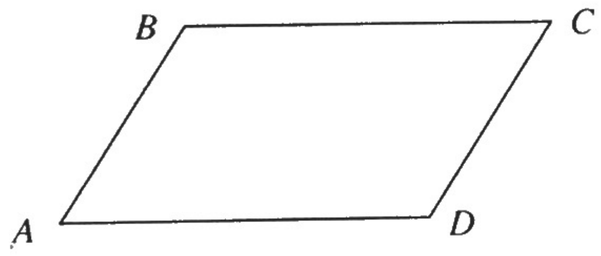


A. 160°
B. 130°
C. 100°
D. 80°
E. 70°

58. At a time when a 6-foot-tall man casts a shadow 10 feet long, a tree casts a shadow 85 feet long. What is the height, in feet, of the tree?

F. 51
G. 34
H. $141\frac{2}{3}$
J. 100
K. 89

59. In parallelogram $ABCD$, $AD = 8$, $AB = 6$, and m$\angle A = 60°$. What is its area?



A. 24
B. 28
C. $24\sqrt{3}$
D. 48
E. $12\sqrt{3}$

60. If the measures of the angles of a triangle can be represented by $x + 15$, $3x - 75$, and $2x - 30$, what kind of triangle must it be?

F. Right
G. Equilateral
H. Obtuse
J. Scalene
K. No such triangle exists.

If there is still time remaining, you may review your answers.