

Kansas City Area Teachers of Mathematics
2014 KCATM Math Competition

GEOMETRY
Grade 8

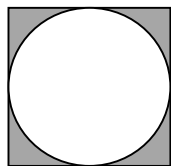
INSTRUCTIONS

- **Do not open this booklet** until instructed to do so.
- Time limit: **20 minutes**
- You **may use calculators**.
- Mark your answer on the Scantron sheet by **FILLING in the oval**.
- You **may not use rulers, protractors, or other measurement devices** on this test.
- Letter **“E” is “None of the above”**. It is a correct answer for some of the problems.
- Use the π key on your calculator.

Student Name _____ Student Number _____

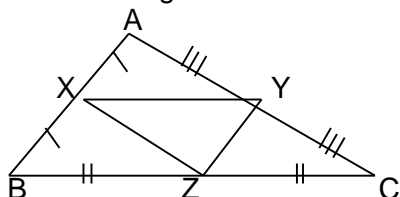
School _____

51. What is the geometric probability of landing in the circle that is inscribed in the square with side lengths 6cm in fraction form and to the nearest hundredth?



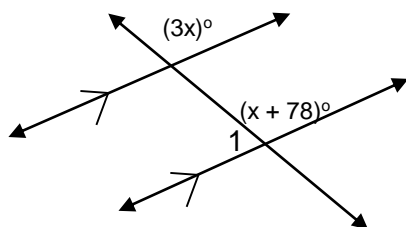
- A. $1/2$ or 0.50
- B. $3/4$ or 0.75
- C. $\pi/4$ or 0.79
- D. $\pi/6$ or 0.52
- E. None of the above

52. Given the triangle and its 3 midsegments, which statement is NOT true?



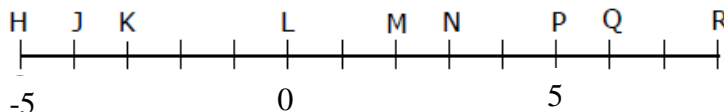
- A. $\overline{XY} \parallel \overline{BC}$
- B. $\triangle XYZ \cong \triangle CBA$
- C. $YZ = \frac{1}{2}(AB)$
- D. $AC = 2(XY)$
- E. None of the above

53. Given the set of parallel lines cut by a transversal, find $m\angle 1$.



- A. 39°
- B. 63°
- C. 78°
- D. 117°
- E. None of the above

Use the following diagram for problems 54.-57.



54. $JQ = ?$

- A. 9
- B. 10.
- C. 11
- D. 12
- E. None of the above

55. The midpoint of \overline{JR} is

- A. L
- B. M
- C. N
- D. P
- E. None of the above

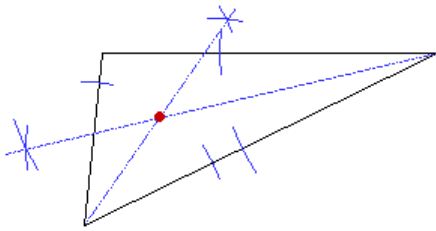
56. What is the ratio of $HK:LN$?

- A. 1:2
- B. 1:3
- C. 2:3
- D. 3:4
- E. None of the above

57. What is the probability of being \overline{MQ} based on the entire line segment?

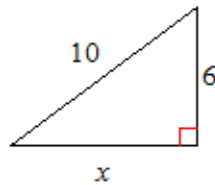
- A. $5/12$
- B. $1/3$
- C. $3/13$
- D. $4/13$
- E. None of the above

58. The picture below shows the construction of



- A. Circumcenter
- B. Incenter
- C. Centroid
- D. Medians
- E. None of the above

59. Solve for x in the right triangle.



- A. 12
- B. 9
- C. 7
- D. 6
- E. None of the above

60. Simplify $\sqrt{18}$

- A. $3\sqrt{2}$
- B. $2\sqrt{3}$
- C. $9\sqrt{2}$
- D. $6\sqrt{3}$
- E. None of the above

61. What is perimeter of a regular pentagon with side lengths of $(2x + 3)$?

- A. $6x + 9$
- B. $8x + 12$
- C. $10x + 15$
- D. $12 + 18$
- E. None of the above

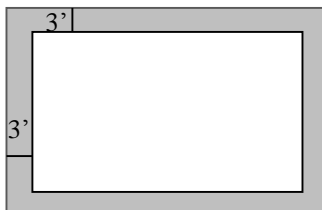
62. What is the area of a square with side lengths of $(4x)$?

- A. $8x$
- B. $8x^2$
- C. $16x$
- D. $16x^2$
- E. None of the above

63. The area formula for an equilateral triangle is $A = \frac{s^2\sqrt{3}}{4}$. Find the exact area of an equilateral triangle with side lengths of 6.

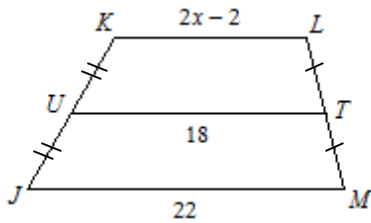
- A. $8\sqrt{3}$
- B. $6\sqrt{3}$
- C. $3\sqrt{3}$
- D. $9\sqrt{3}$
- E. None of the above

64. What is the area of the 3 ft. concrete border surrounding a rectangular pool 40ft. by 30ft.?



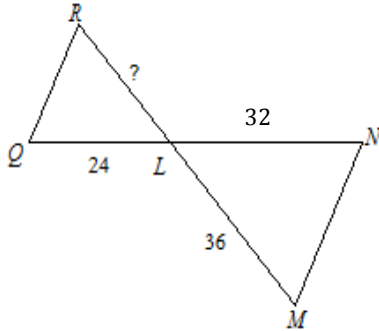
- A. 456 sq. ft.
- B. 219 sq. ft.
- C. 153 sq. ft.
- D. 306 sq. ft.
- E. None of the above

65. Find the value of x given midsegment of the trapezoid JKLM.



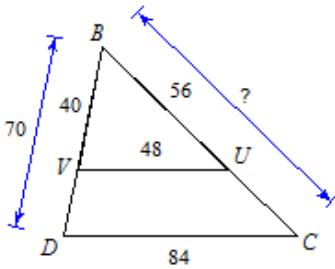
- A. 6
- B. 7
- C. 4
- D. 8
- E. None of the above

66. The two triangles are similar. Find the missing side length.



- A. 20
- B. 17
- C. 27
- D. 24
- E. None of the above

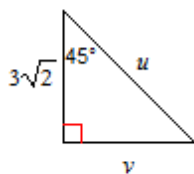
67. Given: $\overline{VU} \parallel \overline{DC}$, find BC.



- A. 64
- B. 98
- C. 51
- D. 105
- E. None of the above

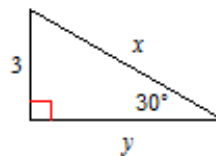
68- 69. Find the missing side lengths of the special triangles.

68.



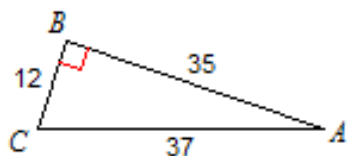
- A) $u = 4\sqrt{3}, v = 3\sqrt{2}$
- B) $u = 6, v = 3\sqrt{2}$
- C) $u = 3\sqrt{2}, v = 6$
- D) $u = 4\sqrt{3}, v = 6\sqrt{2}$
- E) None of the above

69.



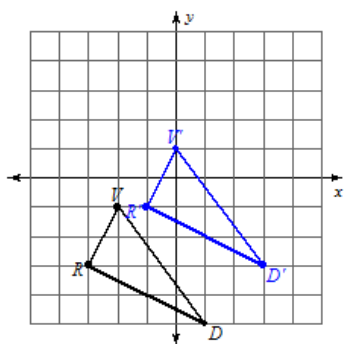
- A) $x = 6, y = 3\sqrt{3}$
- B) $x = 3, y = 3\sqrt{3}$
- C) $x = 6, y = 6\sqrt{3}$
- D) $x = 6\sqrt{3}, y = 6$
- E) None of the above

70. Find the trigonometric ratio: $\cos A$



- A. $35/37$
- B. $37/12$
- C. $35/12$
- D. $12/37$
- E. None of the above

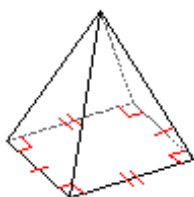
71. What is the rule for the transformation shown on the coordinate plane from the preimage $\triangle RDV$ to the image $\triangle R'D'V'$?



- A. $(x + 3, y + 3)$
- B. $(x + 2, y + 2)$
- C. $(x - 2, y - 2)$
- D. $(x - 3, y - 3)$
- E. None of the above

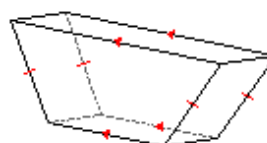
72 – 73. Name the figures below.

72.



- A. Square pyramid
- B. triangular pyramid
- C. tetrahedron
- D. rectangular pyramid
- E. None of the above

73.



- A. hexagonal prism
- B. square prism
- C. trapezoidal prism
- D. rectangular prism
- E. None of the above

74. Two sides of a triangle are 9 and 11. Find the **possible range** of values for the third side.

- A. $2 < x < 20$
- B. $3 < x < 19$
- C. $2 < x < 19$
- D. $4 < x < 16$
- E. None of the above

75. Given the description of the sides of a triangle, order the angles from smallest to largest.

Given:

In $\triangle QRS$

$RS = 8$

$QS = 9$

$QR = 12$

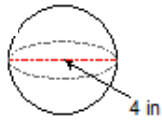
- A) $\angle S, \angle Q, \angle R$
- B) $\angle Q, \angle R, \angle S$
- C) $\angle Q, \angle S, \angle R$
- D) $\angle R, \angle Q, \angle S$
- E) None of the above

76. Which of the following is **NOT** a Pythagorean Triple?

- A. 3, 4, 5
- B. 6, 8, 10
- C. 5, 12, 13
- D. 7, 24, 25
- E. None of the above

Find the volume of each figure. Round your answers to the nearest thousandth, if necessary.

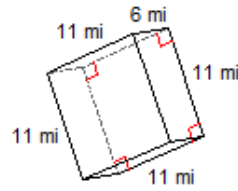
77.



$$V = \frac{4}{3}\pi r^3$$

- A) 26.58 in³
- B) 33.51 in³
- C) 22.7 in³
- D) 268.08 in³
- E) None of the above

78.



- A) 671 mi³
- B) 399 mi³
- C) 969 mi³
- D) 726 mi³
- E) None of the above

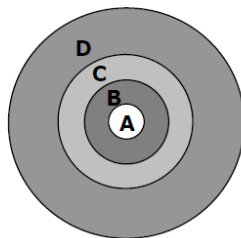
79. An equilateral triangle has a perimeter $(24x + 36)$. What is the side length?
 A. $6x + 9$ B. $8x + 12$ C. $4x + 6$ D. $12x + 18$ E. None of the above

80. If the vertex angle of an isosceles triangle is 36° , what is the measure of one of the base angles?
 A. 36° B. 70° C. 72° D. 63° E. None of the above

81. If the area of a square ABCD is 36 sq cm and the area of square WXYZ is 64 sq. cm. What is the side ratio of WXYZ to ABCD?
 A. 9/16 B. 3/4 C. 16/9 D. 4/3 E. None of the above

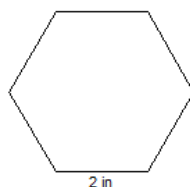
82. Given the following diagram of a dart board, what is the probability of hitting the bulls eye (center circle) if the dart hits somewhere on the circular board?

Circle A: $r = 2$ inches
 Circle B: $r = 4$ inches
 Circle C: $r = 6$ inches
 Circle D: $r = 10$ inches



- A. 1/5
- B. 1/10
- C. 1/20
- D. 1/25
- E. None of the above

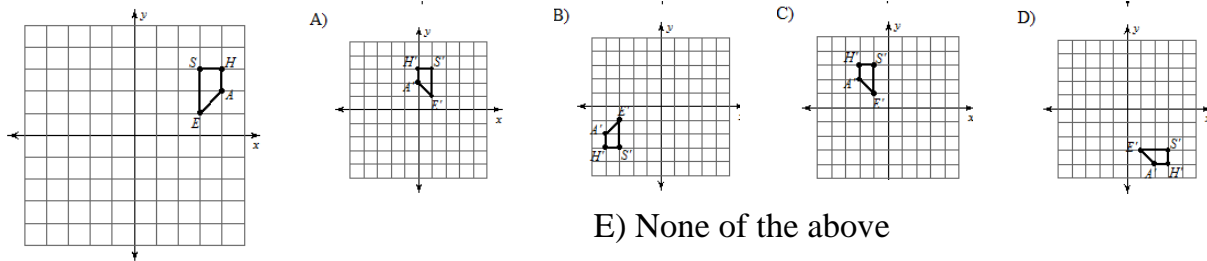
83. Find the area of the regular hexagon given the side length of 2 in.



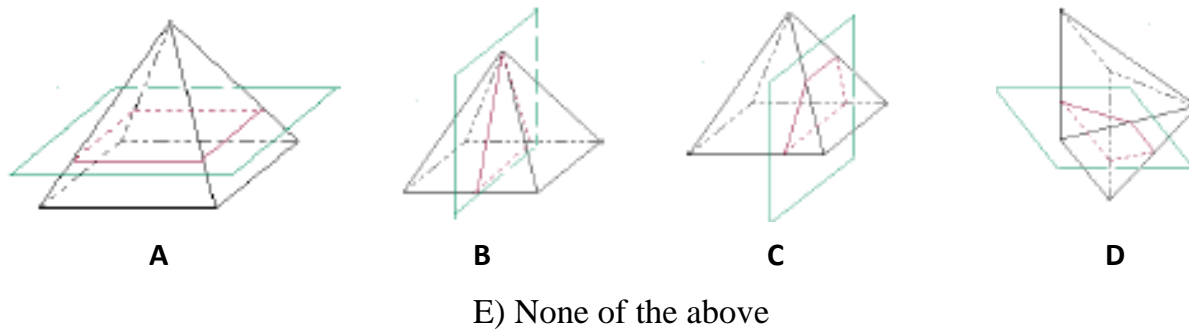
- A) 10.4 in²
- B) 6.9 in²
- C) 12 in²
- D) 20.8 in²
- E) None of the above

84. If you rotate a right triangle about a leg, identify the figure you would get in one rotation.
 A. sphere B. circle C. cone D. ellipse E. None of the above

85. Which figure shows a 180° clockwise rotation of the trapezoid about the origin?



86. Which figure shows a slice drawn **perpendicular to the base** of the square pyramid through the midpoint of the sides of the base?



87. Find the circumference of the **Great Circle** in a sphere with a radius of 14mm.
 A. 87.96mm B. 43.98mm C. 615.75mm D. 14mm E. None of the above

88. Find the distance AB if pt. A is (-4, 2) and B is (0, -1) on a coordinate graph.
 A. 5 B. 4 C. 6 D. 7 E. None of the above

89. What is the equation of a circle that has its center at the origin and has a radius of 5?
 A. $x^2 + y^2 = 5$ B. $(x - 5)^2 + (y - 5)^2 = 1$ C. $(x - 1)^2 + (y - 1)^2 = 25$
 D. $x^2 + y^2 = 25$ E. None of the above

90. Given the “if, then” statement: “If John scores 40 out of 40, then he has perfect paper.” If the statement is changed to: “If John does not have a score of 40 out of 40, then he does not have a perfect paper”, which logic statement does this change show?
 A. Conditional B. Converse C. Inverse
 D. Contrapositive E. None of the above

Shade the correct answer!

Name _____

Example: A B C D E

School _____

51. A B C D E

52. A B C D E

53. A B C D E

54. A B C D E

55. A B C D E

56. A B C D E

57. A B C D E

58. A B C D E

59. A B C D E

60. A B C D E

61. A B C D E

62. A B C D E

63. A B C D E

64. A B C D E

65. A B C D E

66. A B C D E

67. A B C D E

68. A B C D E

69. A B C D E

70. A B C D E

71. A B C D E

72. A B C D E

73. A B C D E

74. A B C D E

75. A B C D E

76. A B C D E

77. A B C D E

78. A B C D E

79. A B C D E

80. A B C D E

81. A B C D E

82. A B C D E

83. A B C D E

84. A B C D E

85. A B C D E

86. A B C D E

87. A B C D E

88. A B C D E

89. A B C D E

90. A B C D E

Shade the correct answer!

Example: A ● C D E

Name _____

School _____

Answer Key

51. A B ● D E

52. A B C ● E

53. A ● C D E

54. A ● C D E

55. A ● C D E

56. A B ● D E

57. A B C ● E

58. A ● C D E

59. A B C D ●

60. ● B C D E

61. A B ● D E

62. A B C ● E

63. A B C ● E

64. ● B C D E

65. A B C ● E

66. A B ● D E

67. A ● C D E

68. A ● C D E

69. ● B C D E

70. ● B C D E

71. A ● C D E

72. A B C ● E

73. A B ● D E

74. ● B C D E

75. A ● C D E

76. A B C D ●

77. A ● C D E

78. A B C ● E

79. A ● C D E

80. A B ● D E

81. A B C ● E

82. A B C ● E

83. ● B C D E

84. A B ● D E

85. A ● C D E

86. A ● C D E

87. ● B C D E

88. ● B C D E

89. A B C ● E

90. A B ● D E