Kansas City Area Teachers of Mathematics
2017 KCATM Math Competition

GEOMETRY AND MEASUREMENT TEST
GRADE 6

INSTRUCTIONS

- **Do not open this booklet** until instructed to do so.

- Time limit: **20 minutes**
- Mark your answer on the answer sheet by **FILLING in the oval**.
- You **may** use calculators.
- For pi, use the π key or 3.14159 on your calculator.
- You **may not** use rulers, protractors, or other measurement devices on this test.
- Letter **"E"** is **"None of the above"** or **"Not given"**. It may be the correct answer to some of the problems.
- The **figures are not to scale.**

| Area Formulas:	
Triangle	$A = \dfrac{bh}{2}$
Parallelogram	$A = bh$
Trapezoid	$A = \dfrac{h(b_1 + b_2)}{2}$
Volume Formulas:	
Rect. Prism	$V = lwh$
Cylinder	$V = \pi r^2 h$

Student Name _____ Student Number _____

School _____

51.   Compare the sides in a square to the sides of a rectangle.

    A.   The number of pairs of parallel sides in a square > the number of pairs of parallel sides in a rectangle.
    B.   The number of pairs of parallel sides in a square < the number of pairs of parallel sides in a rectangle.
    C.   The number of pairs of parallel sides in a square = the number of pairs of parallel sides in a rectangle.
    D.   The number of pairs of parallel sides in a rectangle < the number of pairs of parallel sides in a square.
    E.   None of the above.

52.   Use the figure at the right to represent a pizza cut into 8 equal slices. Each slice of a pizza has an angle at the center equal to:
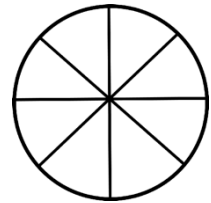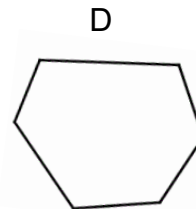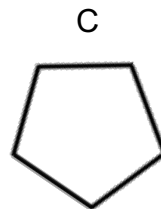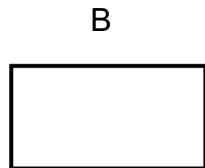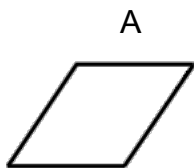
    A. 90°   B. 45°   C. 70°   D. 25°   E. None of the above

53.   Which of the following is **NOT** a name for the angle?
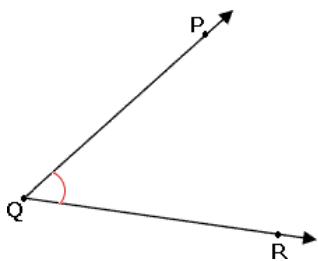
    A. $\angle Q$

    B. $\angle RQP$

    C. $\angle PQR$

    D. $\angle RPQ$

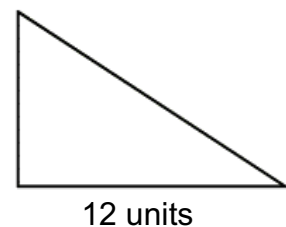   E. None of the above

54.   Which figure appears to be a **regular** polygon?

    A   B   C   D

    E. None of the above
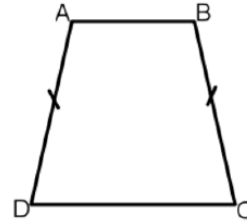
55. What is the **area** of the right triangle with base 12 and the height 2/3 the base length?

    A. 48 units^2 B. 4 units^2 C. 54 units^2
    D. 96 units^2 E. None of the above

12 units

56. Which term best describes the trapezoid?
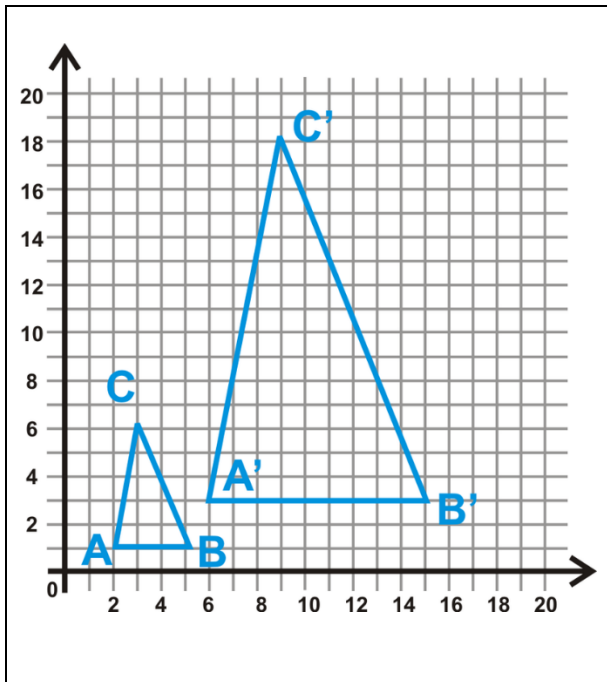
   A. Equilateral   B. Isosceles   C. Scalene   D. Acute
   E. None of the above

57. **Supplementary** angles have what sum?

   A. 360°   B. 60°   C. 75°   D. 180°   E. None of the above

Use the <u>similar</u> triangles in the coordinate plane for problems #58-60.

58. What are the coordinates of A' ?

   A. (2, 1)   B. (1, 2)   C. (6, 3)
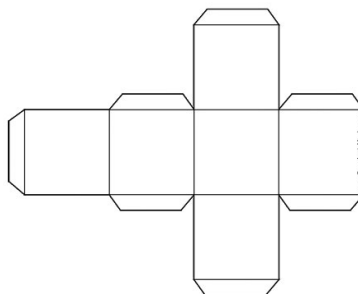   D. (3, 6)   E. None of the above

59. What is the **area** of $\triangle A'B'C'$?

   A. 67.5 units^2 B. 135 units^2
   C. 270 units^2 D. 81 units^2
   E. None of the above

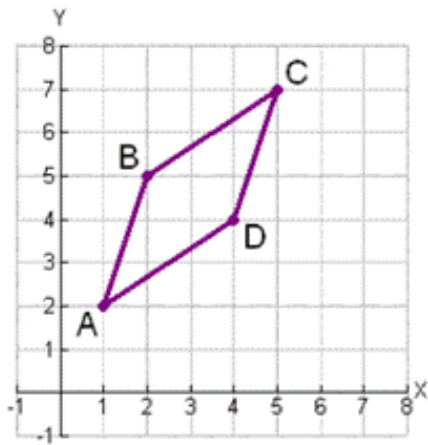60. What is the ratio of $\triangle A'B'C'$ to $\triangle ABC$?

   A. 5:1   B. 4:1   C. 3:1   D. 2:1
   E. None of the above

61. What is the technically correct name for the polyhedron that is formed when the net is folded. *Note: All sides are congruent in the figure.*

   A. Box   B. Rectangular prism   C. Square Pyramid   D. Cube
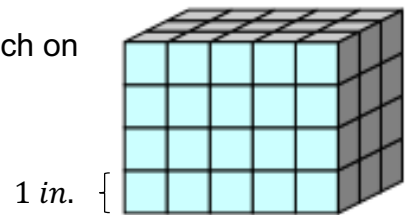   E. None of the above

Use the triangle in the coordinate plane for problems #62-64.

62. What is the slope of $\overline{AB}$?

A. $\dfrac{3}{1}$ B. $\dfrac{1}{3}$ C. $\dfrac{2}{1}$ D. $\dfrac{1}{2}$

E. None of the above

63. Use the Pythagorean Theorem to find the distance BC. Leave your answer in radical form.

A. $\sqrt{5}$ B. $\sqrt{13}$ C. $\sqrt{1}$
D. $\sqrt{10}$ E. None of the above

64. Compare the slopes of slopes and the distances of the opposite sides of the quadrilateral. What is the best name for the shape?

A. Rhombus   B. Kite   C. Parallelogram
D. Trapezoid   E. None of the above

65. A rectangular prism is packed with cubes that measure 1 inch on each side. What is the volume of the rectangular prism?

A. 100 in^3 B. 60 in^3 C. 45 in^3

D. 12 in^3 E. None of the above

1 *in.*

66. 6 yards = ___ inches

A. 18 in.   B. 72 in.   C. 0.5 in.   D. 36 in.   E. None of the above

67. 10.5 m = ___ cm

A. 1,050 cm   B. 105 cm   C. 10,500 cm   D. 105,000   E. None of the above

68. The scale of a drawing is 2 cm: 5 m. What is the actual width of a room if the width in the scale drawing is 7 cm?

A. 14 m   B. 17.5 m   C. 10 cm   D. 35 cm   E. None of the above

Use the diagram below for #69-70.

69. What is the perimeter of the composite shape?

    A. 60 units   B. 40 units
    C. 54 units   D. 66 units
    E. None of the above

70. What is the area of the composite shape?

    A. 290 units^2 B. 176 units^2
    C. 158 units^2 D. 173 units^2
    E. None of the above

Use the diagram for #71-72.

71. What would be the coordinates of P' when the figure is **reflected over the x axis?**

    A. (2, -6)   B. (-2, 6)   C. (6, -2)
    D. (-6, 2)   E. None of the above

72. What would be the coordinates of P' when the figure is **translated left one and up three** which is the rule:
(x, y) → (x − 1, y + 3)?

    A. (5, 5)   B. (1, 9)   C. (2, 6)
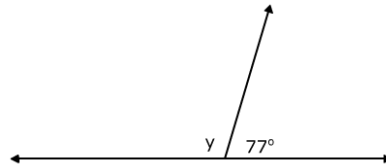   D. (7, -1)   E. None of the above

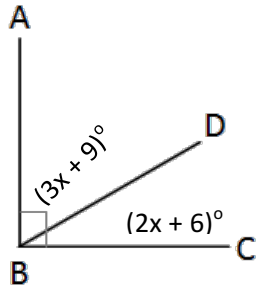73. Which transformation is shown on the graph?
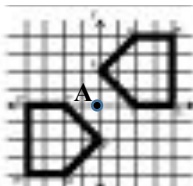
    A. Translation
    B. Reflection
    C. Rotation about the given point, A
    D. Dilation
    E. None of the above

74. Determine the value of y.

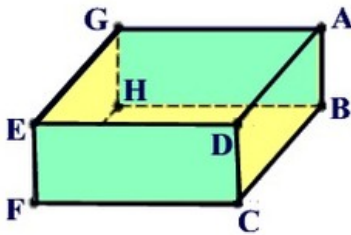A. 71°   B. 123°   C. 103°
D. 13°   E. None of the above

75. Use the diagram below to **solve for x**.

A. 12
B. 13
C. 14
D. 15
E. None of the above

The angle $(3x + 9)°$ and $(2x + 6)°$

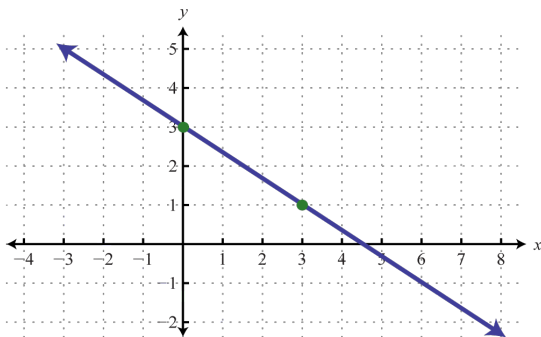**Use the rectangular prism below to answer problems #76-77.**

76. Name a line that is parallel to $\overline{EG}$.

A. $\overline{FH}$ B. $\overline{GA}$ C. $\overline{DC}$ D. $\overline{EF}$
E. None of the above

77. Name a line that is perpendicular to $\overline{EG}$.

A. $\overline{BC}$ B. $\overline{GA}$ C. $\overline{DC}$ D. $\overline{AB}$
E. None of the above

Use coordinate graph below for problems #78-79.

78. What is the **linear equation** for the line?
A. $y = -\frac{3}{2}x + 3$ B. $y = -\frac{2}{3}x + 3$

C. $y = -3x + 2$ D. $y = 3x + 1$
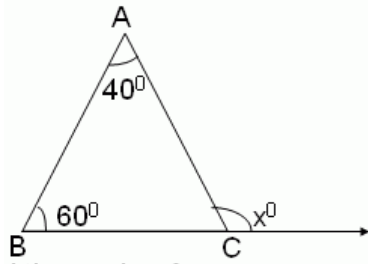
E. None of the above

79. What is the **equation** for a line **parallel** to the given line?
A. $y = \frac{3}{2}x$ B. $y = -\frac{2}{3}x$

C. $y = \frac{2}{3}x$ D. $y = -\frac{3}{2}x$

E. None of the above

80. If a 10 ft. flagpole casts a 15 ft. shadow, **how long is a shadow cast by a 24 ft. house** at the same time?
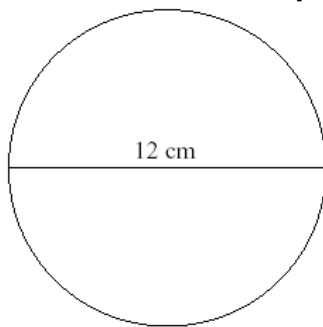
    A. 16 ft.   B. 32 ft.   C. 36 ft.   D. 48 ft.   E. None of the above

81. Find the value of the **exterior angle, x.**

    A. 100°   B. 80°

    C. 60°   D. 140°

    E. None of the above

Use the circle to for problems #82-83.

82. Find the **circumference** of the circle in terms of π.

    A. $144\,\pi$ cm   B. $36\,\pi$ cm
    C. $12\,\pi$ cm   D. $24\,\pi$ cm
    E. None of the above

83. Find the **area** of the circle in terms of π.

    A. $144\,\pi$ cm^2 B. $36\,\pi$ cm^2
    C. $12\,\pi$ cm^2 D. $24\,\pi$ cm^2
    E. None of the above

84. If a square garden is enclosed by 24.8 meters of fencing. What is the area of the garden to the nearest tenth?

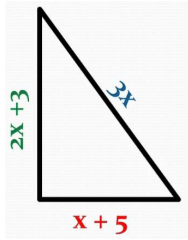   A. 153.8 m^2 B. 38.4 m^2 C. 615.0 m^2 D. 17.1 m^2 E. None of the above

85. Which conclusion can be drawn from these statements?

If the vase is made of glass, then it is fragile.
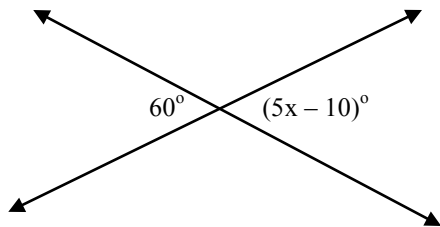**The vase is made of glass.**

    A. The vase is fragile.   B. The vase is not fragile.
    C. The vase is not made of glass.   D. All of these
    E. None of the above

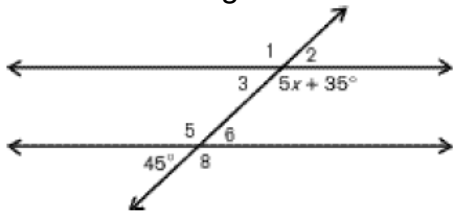86. The perimeter of the triangle is 50. **Solve for the value of x.**

2x + 3
3x
x + 5

A. x = 7   B. x = 8   C. x = 9

D. x = 11   E. None of the above

87. Use the diagram to **solve for x.**

$60°$ $(5x - 10)°$

A. x = 10   B. x = 12   C. x = 13

D. x = 15   E. None of the above

88. Use the diagram to **solve for x.**

1 2
3 $5x + 35°$
5 6
45° 8

A. x = 2   B. x = 20   C. x = 45

D. x = 25   E. None of the above

Use the Volume Formulas for problems #89-90

| **Rectangular Prism**   V = l x w x h | **Cylinder:** $V = \pi r^2 h$ |

4 ft
8 ft
12 ft
8 ft
14 ft

89. Find the **volume of the cylinder** to the nearest whole number.

A. 804 ft^3 B. 101 ft^3
C. 145 ft^3 D. 402 ft^3
E. None of the above

90.   What is the total **volume of the figure** to the nearest whole number?

A. 1746 ft^3
B. 2550 ft^3
C. 1891 ft^3
D. 1847 ft^3
E.   None of the above