

Kansas City Area Teachers of Mathematics
2017 KCATM Math Competition

**GEOMETRY AND MEASUREMENT TEST
GRADE 7**

INSTRUCTIONS

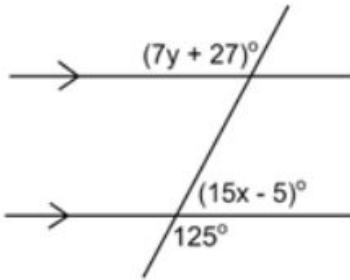
- Do not open this booklet until instructed to do so.
- Time limit: **20 minutes**
- Mark your answer on the answer sheet by **FILLING in the oval**.
- You **may** use calculators.
- For pi, use the π key or 3.14159 on your calculator.
- You **may not** use rulers, protractors, or other measurement devices 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	$A = \frac{bh}{2}$
Parallelogram	$A = bh$
Trapezoid	$A = \frac{h(b_1 + b_2)}{2}$
Volume Formulas:	
Rect. Prism	$V = lwh$
Cylinder	$V = \pi r^2 h$

Student Name _____ Student Number _____

School _____

#51-52: Use the diagram with 2 parallel lines cut by a transversal to find the values of x and y .



51. Solve for x .

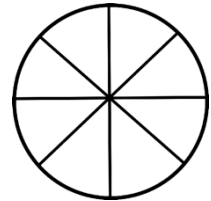
- A. $x = 3$ B. $x = 4$ C. $x = 5$
- D. $x = 8.7$ E. None of the above

52. Solve for y .

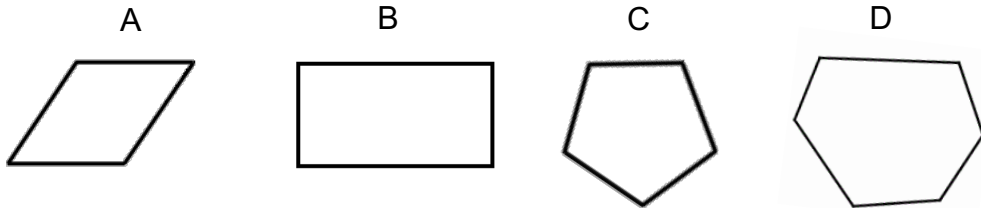
- A. $y = 4$ B. $y = 10$ C. $y = 14$
- D. $y = 21.7$ E. None of the above

53. Use the diagram to represent a pizza cut into 8 equal slices. What is the central angle measure (angle at the center) of 3 slices of a pizza in the diagram.

- A. 120° B. 90° C. 45° D. 135° E. None of the above



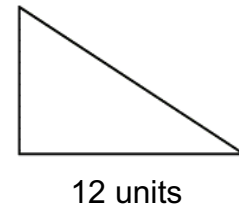
54. Which figure appears to be a **regular** polygon?



- E. None of the above

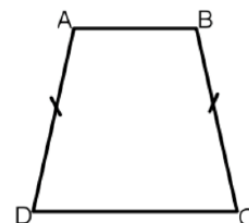
55. What is the **area** of the right triangle with base 12 and the height $\frac{2}{3}$ the base length?

- A. 48 units² B. 4 units² C. 54 units²
- D. 96 units² E. None of the above



56. Which term best describes the trapezoid?

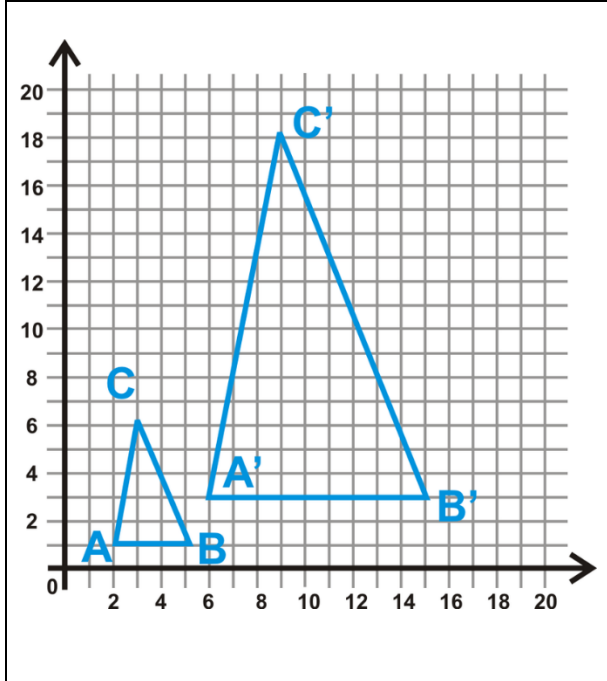
- A. Equilateral B. Isosceles C. Scalene D. Acute
- E. None of the above



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

- A. 360° B. 90° C. 75° D. 180° E. None of the above

Use the similar 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

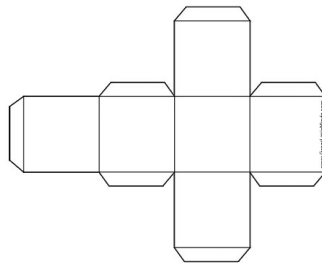
59. What is the **area** of $\Delta A'B'C'$?

- 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 $\Delta A'B'C'$ to ΔABC ?

- 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.*



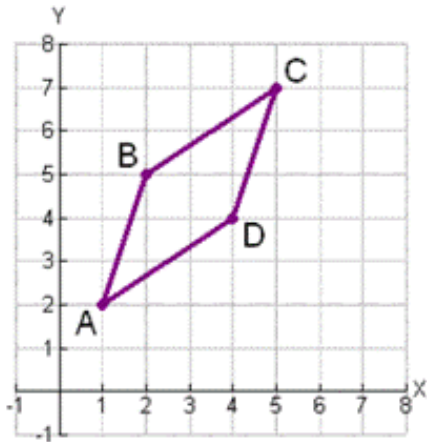
- A. Box B. Rectangular prism C. Square Pyramid D. Cube
E. None of the above

62. If you slice a cylinder through the 2 bases (see figure), what cross-section shape would you get if you opened the cylinder?

- A. rectangle B. circle C. square D. semi-circle
E. None of the above



Use the triangle in the coordinate plane for problems #63-65.



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

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

E. None of the above

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

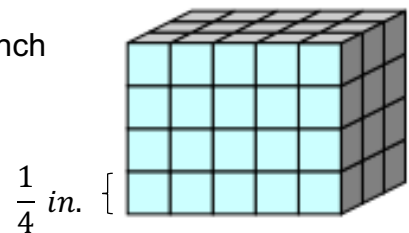
- A. $\sqrt{5}$ B. $\sqrt{13}$ C. $\sqrt{1}$
 D. $\sqrt{10}$ E. None of the above

65. Comparing the slopes of slopes and the distances of 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

66. A rectangular prism is packed with cubes that measure $\frac{1}{4}$ inch on each side. What is the **volume** of the rectangular prism?

- A. 0.9375 in^3 B. 15 in^3 C. 3.75 in^3
 D. 7.5 in^3 E. None of the above



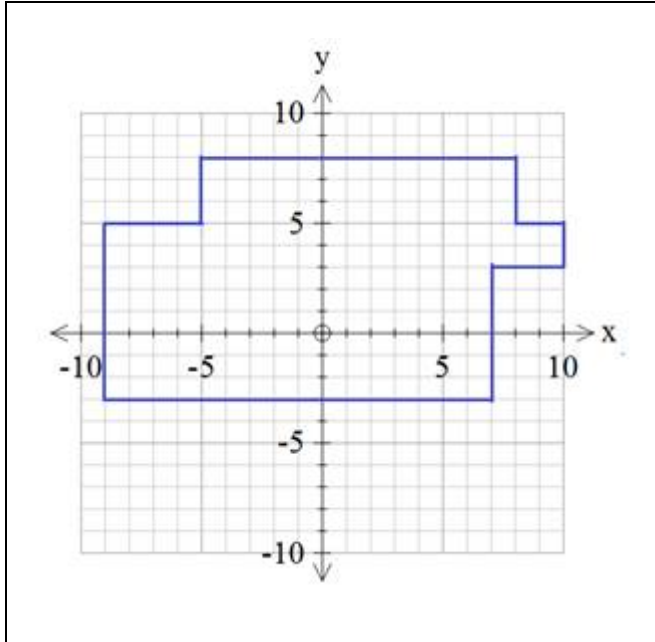
67. What is the **radius** of a circle that has a circumference of 12π inches ?

- A. 12 in. B. 26 in. C. 6 in. D. 36 in. 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. 70 cm E. None of the above

Use the diagram below for #69-70.



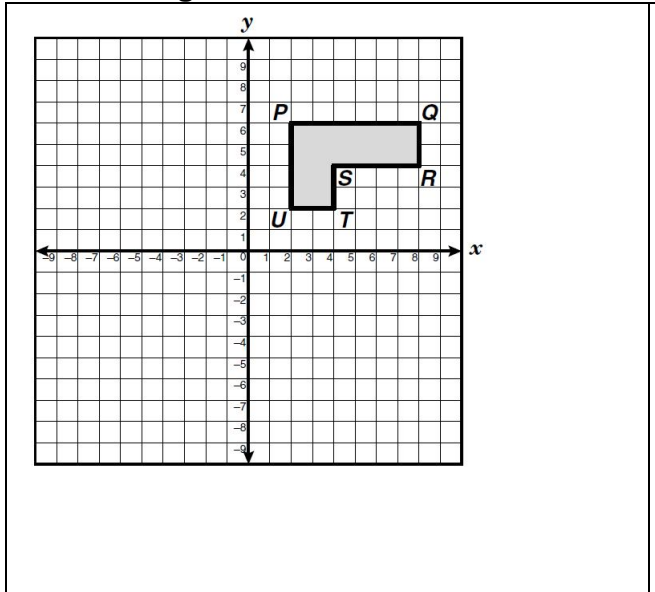
69. What is the perimeter of the composite shape?

- A. 59 units
- B. 60 units
- C. 54 units
- D. 66 units
- E. None of the above

70. What is the area of the composite shape?

- A. 290 units²
- B. 176 units²
- C. 158 units²
- D. 173 units²
- E. None of the above

Use the diagram for #71-72.



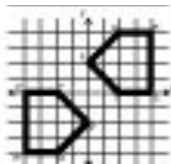
71. What would be the coordinates of P' when the figure is reflected over the x axis?

- 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: $(x, y) \rightarrow (x - 1, y + 3)$?

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

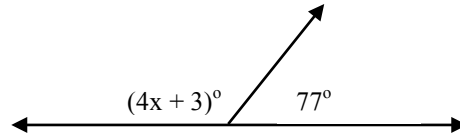
73. Using one transformation, which one was used on the pentagon?



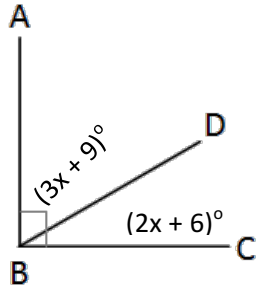
- A. Translation
- B. Reflection
- C. Rotation
- D. Dilation
- E. None of the above

74. Determine the **value of x**.

- A. 18.5° B. 23° C. 103°
 D. 25° E. None of the above

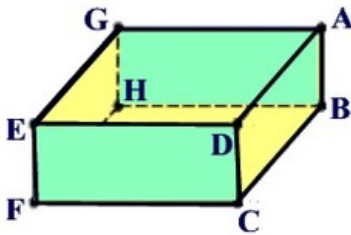


75. Use the diagram below to **find $m\angle DBC$** .



- A. 51° B. 12° C. 14°
 D. 34° E. None of the above

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



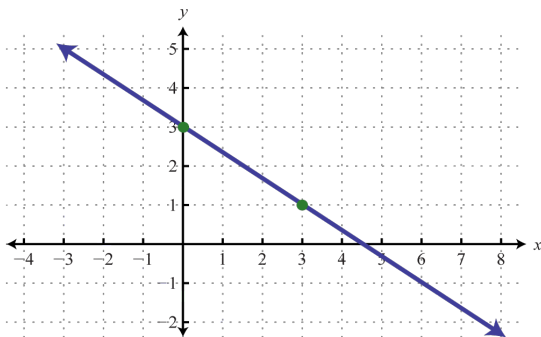
76. Name a line that is parallel to \overline{EG} .

- 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

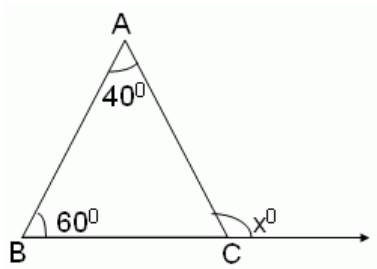
79. What is the **equation** for a line **perpendicular** to the given line?

- 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?

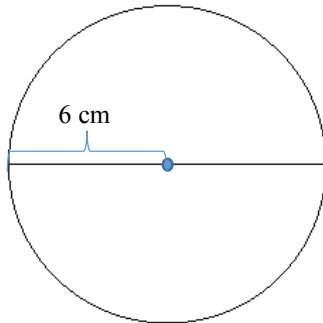
- A. 16 ft. B. 32 ft. C. 36 ft. D. 48 ft. E. None of the above

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. 144π cm B. 36π cm
 C. 12π cm D. 24π cm
 E. None of the above

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

- A. 144π cm² B. 36π cm²
 C. 12π cm² D. 24π cm²
 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?

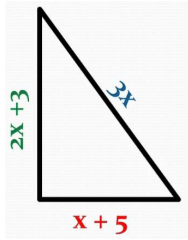
- A. 153.8 m² B. 38.4 m² C. 615.0 m² D. 17.1 m² E. None of the above

85. Which conclusion can be drawn from these statements?

**If it is summer, then I go on vacation.
 I go on vacation.**

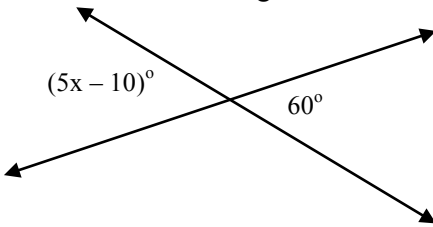
- A. It is summer. B. It is not summer.
 C. I did not go on vacation. D. All of these
 E. None of the above

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



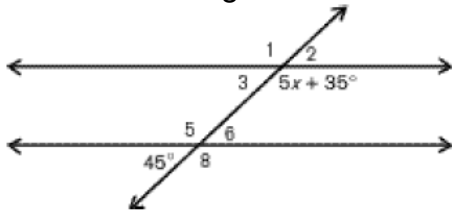
- A. $x = 7$
- B. $x = 8$
- C. $x = 9$
- D. $x = 11$
- E. None of the above

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



- A. $x = 26$
- B. $x = 12$
- C. $x = 13$
- D. $x = 14$
- E. None of the above

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



- 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 $V = l \times w \times h$

Cylinder: $V = \pi r^2 h$

	<p>89. Find the volume of the cylinder to the nearest whole number.</p> <ul style="list-style-type: none"> A. 804 ft^3 B. 101 ft^3 C. 145 ft^3 D. 402 ft^3 E. None of the above
	<p>90. What is the total volume of the figure to the nearest whole number?</p> <ul style="list-style-type: none"> A. 1746 ft^3 B. 2550 ft^3 C. 1891 ft^3 D. 1847 ft^3 E. None of the above