

Kansas City Area Teachers of Mathematics
2016 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	$A = \frac{bh}{2}$
Parallelogram	$A = bh$
Trapezoid	$A = \frac{h(b_1 + b_2)}{2}$

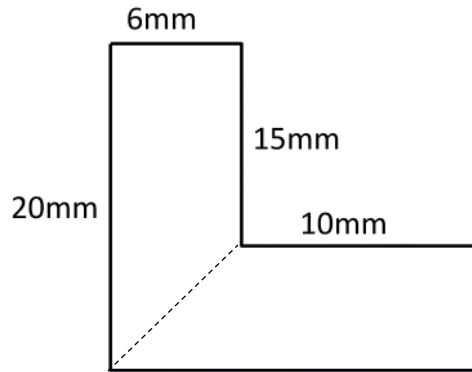
Volume Formulas:

Rect. Prism	$V = lwh$
Cylinder	$V = \pi r^2 h$

Student Name _____ Student Number _____

School _____

Use the following composite shape for problems #51-53.



51. What is the **perimeter of the L shaped figure**?

- A. 72mm B. 51mm C. 71mm D. 120mm E. None of the above

52. What is the **area of the L shaped figure**?

- A. 120mm^2 B. 140mm^2 C. 150mm^2 D. 170mm^2 E. None of the above

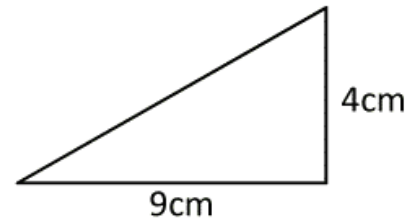
53. If a **diagonal line** (see dashed line above) was drawn to form 2 trapezoids, what would be the **area of the trapezoid on the left**?

- A. 41mm^2 B. 75mm^2 C. 105mm^2 D. 85mm^2 E. None of the above

Use the triangle on the right for problems #54-56.

54. What is the **area of the right triangle**?

- A. 13cm^2 B. 18cm^2 C. 26cm^2
D. 6.5mm^2 E. None of the above



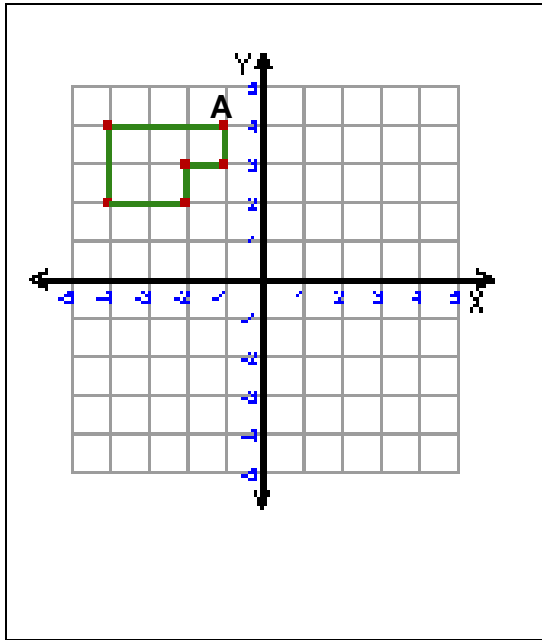
55. Which term best describes the right triangle **classifying it by its sides**?

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

56. What is the **sum of the two acute angles** in the right triangle?

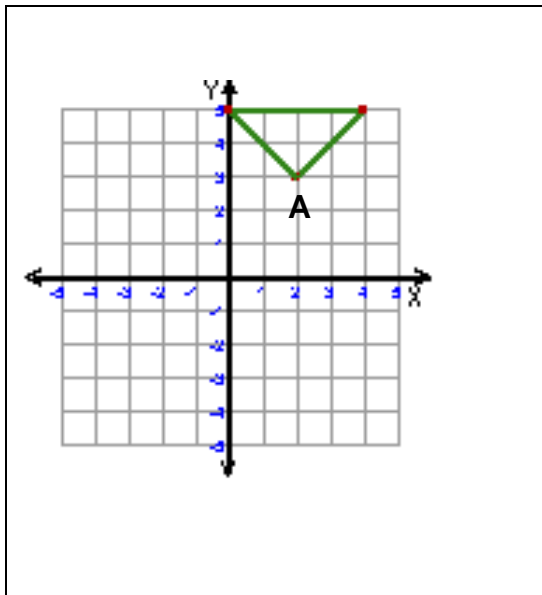
- A. 45° B. 60° C. 75° D. 180° E. None of the above

Use the composite shape in the coordinate plane for problems #57-59.



57. In **which quadrant** is the figure located?
- A. I B. II C. III D. IV
E. None of the above
58. If you reflect the figure below **across the y-axis**, what would be the coordinates of the A' (the reflection of pt. A)?
- A. (-1, 4) B. (1, 4) C. (4, 1)
D. (4, -1) E. None of the above
59. What is the **area** of the figure?
- A. 10 units B. 10 sq. units C. 5 units
D. 5 sq. units E. None of the above

Use the triangle in the coordinate plane for problems #60-62.



60. What are the **coordinates of pt. A**?
- A. (2, 3) B. (3, 2) C. (-2, 3)
D. (-2, -3) E. None of the above
61. If you **translate the triangle down 4 and left 1**, what would be the **new coordinates of A, called A'**?
- A. (1, -1) B. (2, -1) C. (3, -1)
D. (2, -2) E. None of the above
62. What is the **area** of the triangle?
- A. 4 units B. 4 sq. units C. 8 units
D. 8 sq. units E. None of the above

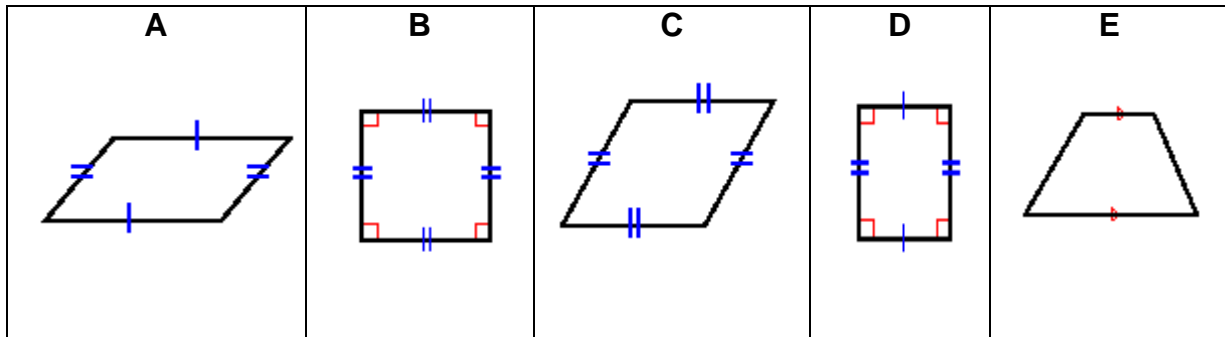
63. 5 km = ___ m

- A. 50m B. 500m C. 5000m D. 0.5m E. None of the above

64. A basketball player who is 6'5" is how many inches tall?

- A. 65 in. B. 72 in. C. 75 in. D. 77 in. E. None of the above

Use the figures below to respond to problems #65-68.



65. Which of the above figures are **parallelograms**?

- A. A B. A & C C. B & D D. A, B, C & D E. None of the above

66. Which of the above figures are **rhombi**?

- A. A B. B C. B & C D. E E. None of the above

67. Which of the above figures are **rectangles**?

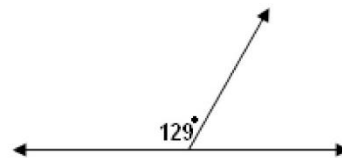
- A. D B. B C. A & C D. B & D E. None of the above

68. Which of the above figures are **quadrilaterals**?

- A. A & C B. B & D C. A, B, C, D & E D. A, B, C & D E. None of the above

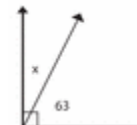
69. What is the **supplement** of the given angle?

- A. 51° B. 39° C. 129°
 D. 61° E. None of the above

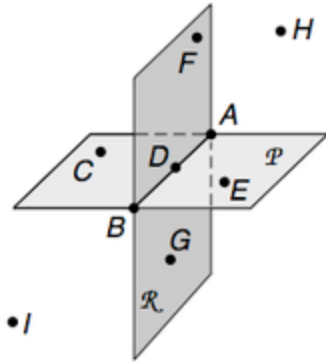


70. What is the **complement**, x° , of the given angle?

- A. 23° B. 27° C. 90°
 D. 63° E. None of the above



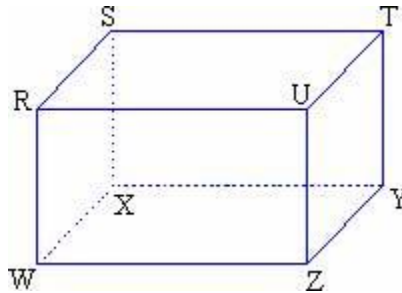
Use the diagram below to answer problems #71-72.



71. Name a line that is **on** with **Plane P**.
 A. \overleftrightarrow{AB} B. \overleftrightarrow{FG} C. \overleftrightarrow{CH} D. \overleftrightarrow{IE}
 E. None of the above

72. Name a point **not** on either Plane R or Plane P.
 A. C B. G C. F D. B
 E. None of the above

Use the rectangular solid below to answer problems #73-75.



73. Name a **horizontal face** on the rectangular solid.
 A. RSXW B. XYZW C. RUWZ D. TUZY E. None of the above

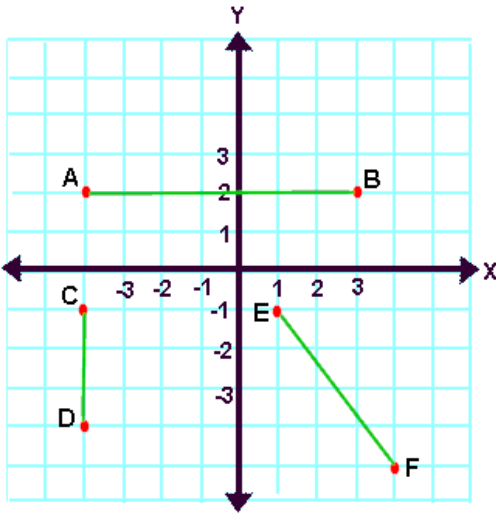
74. Name a line segment that is **parallel** to \overline{XY} .
 A. \overline{YZ} B. \overline{WX} C. \overline{ST} D. \overline{SX} E. None of the above

75. Name a line segment that is **perpendicular** to \overline{XY} .
 A. \overline{YZ} B. \overline{RW} C. \overline{WZ} D. \overline{UZ} E. None of the above

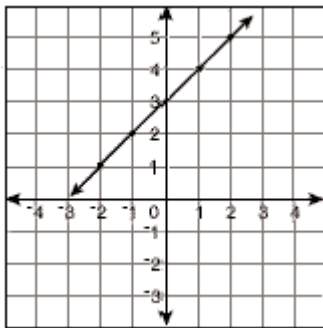
Decide if the logic is **inductive**, based on patterns, or **deductive**, based on facts, theory, or definitions.

76. If $2x + 7 = 23$, then $x = 8$
 A. Inductive B. Deductive

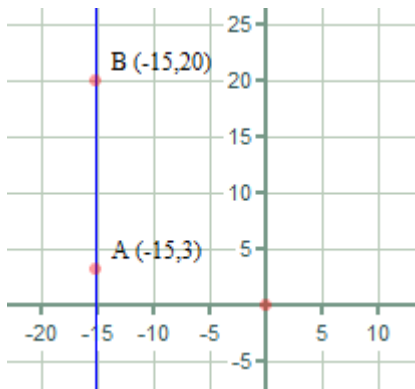
Use the coordinate graph below for problems #77-79.



77. What is the **slope** of \overline{AB} ?
 A. 1 B. $1/7$ C. undefined
 D. 0 E. None of the above
78. What is the **slope** of \overline{EF} ?
 A. $-3/4$ B. $-4/3$ C. undefined
 D. 0 E. None of the above
79. Given the Pythagorean Theorem: In a right triangle, the sum of the squares of the legs equals the square of the hypotenuse, **find EF**.
 A. 1 B. 3 C. 4 D. 5
 E. None of the above




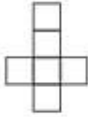
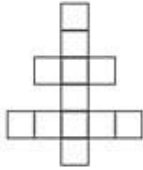
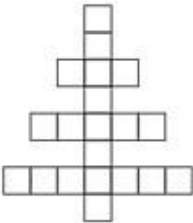
80. What is the **linear equation** for the line?
 A. $y = -1x + 3$ B. $y = -3x + 1$
 C. $y = 1x + 3$ D. $y = 3x + 1$
 E. None of the above



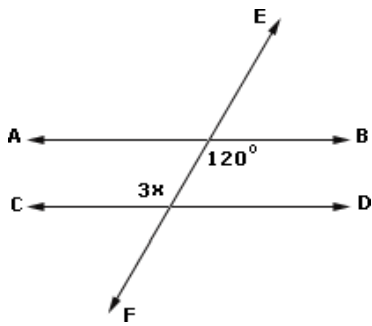
81. What is the **linear equation** for the line?
 A. $y = 20$ B. $x = -15$
 C. $y = 3$ D. $y = 17x - 5$
 E. None of the above

82. You are buying lemonade for your classroom. There are 24 students that each will have an 8 oz. glass of lemonade. **How many gallons** of lemonade do you have to buy to have each student have only one glass?

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

Stage 1		2 unit squares	83. How many unit squares would be in Stage 7 ? A. 30 B. 42 C. 56 D. 72 E. None of the above
Stage 2		6 unit squares	
Stage 3		12 unit squares	
Stage 4			

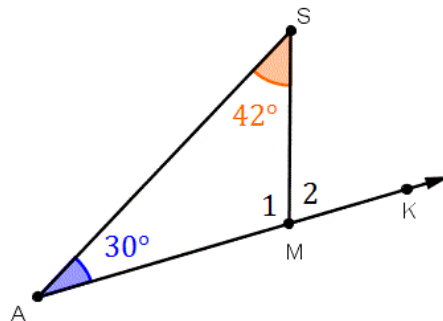
84. Find the value of x :

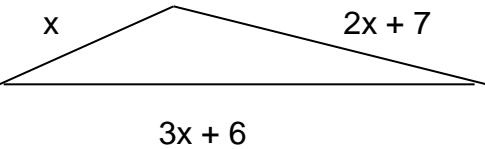
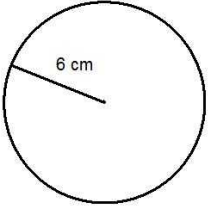
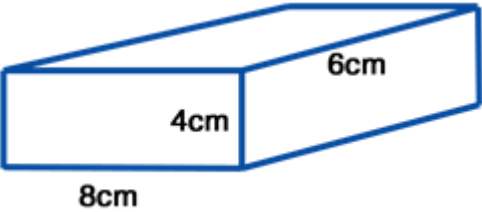


- A. $x = 117$ B. $x = 20$ C. $x = 60$
 D. $x = 123$ E. None of the above

85. What are the measures of angles 1 and 2 in the diagram below?

	$m\angle 1$	$m\angle 2$
A.	108°	72°
B.	72°	108°
C.	98°	82°
D.	82°	98°
E.	None of the above	

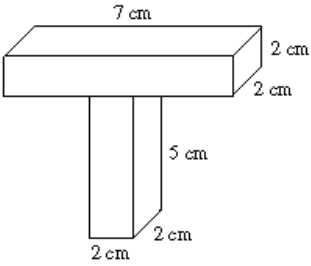
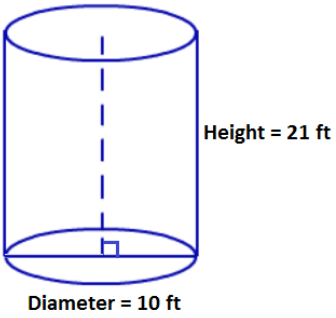


<p>86. Perimeter = 31 Find x.</p> 	<p>A. 2.25 B. 3 C. 2.5 D. 4 E. None of the above</p>																		
<p>87. Find the exact circumference and the area.</p> 	<table border="1"> <thead> <tr> <th></th> <th>Circumference</th> <th>Area</th> </tr> </thead> <tbody> <tr> <td>A.</td> <td>6π cm</td> <td>36π cm²</td> </tr> <tr> <td>B.</td> <td>6π cm</td> <td>12π cm²</td> </tr> <tr> <td>C.</td> <td>12π cm</td> <td>36π cm²</td> </tr> <tr> <td>D.</td> <td>12π cm</td> <td>12π cm²</td> </tr> <tr> <td>E.</td> <td colspan="2">None of the above</td> </tr> </tbody> </table>		Circumference	Area	A.	6π cm	36π cm ²	B.	6π cm	12π cm ²	C.	12π cm	36π cm ²	D.	12π cm	12π cm ²	E.	None of the above	
	Circumference	Area																	
A.	6π cm	36π cm ²																	
B.	6π cm	12π cm ²																	
C.	12π cm	36π cm ²																	
D.	12π cm	12π cm ²																	
E.	None of the above																		
<p>88. Find the surface area.</p> 	<p>A. 56 sq. cm B. 104 sq. cm C. 112 sq. cm D. 208 sq. cm E. None of the above</p>																		

Volume Formulas:

Rectangular Prism $V = l \times w \times h$

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

<p>89. Find the volume.</p> 	<p>A. 20 cm³ B. 28 cm³ C. 56 cm³ D. 48 cm³ E. None of the above</p>
<p>90. Find the exact volume.</p> 	<p>A. 525 ft³ B. 210 ft³ C. 2100 ft³ D. 105 ft³ E. None of the above</p>

Shade the correct answer!

Example: A ● C D E

Name _____

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 B C D E

Name _____

School _____

ANSWER KEY

- | | | | | | | | | | | | |
|-----|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|-----|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| 51. | <input checked="" type="radio"/> | B | C | D | E | 71. | <input checked="" type="radio"/> | B | C | D | E |
| 52. | A | B | C | <input checked="" type="radio"/> | E | 72. | A | B | C | D | <input checked="" type="radio"/> |
| 53. | A | B | <input checked="" type="radio"/> | D | E | 73. | A | <input checked="" type="radio"/> | C | D | E |
| 54. | A | <input checked="" type="radio"/> | C | D | E | 74. | A | B | <input checked="" type="radio"/> | D | E |
| 55. | A | B | <input checked="" type="radio"/> | D | E | 75. | <input checked="" type="radio"/> | B | C | D | E |
| 56. | A | B | C | D | <input checked="" type="radio"/> | 76. | A | <input checked="" type="radio"/> | C | D | E |
| 57. | A | <input checked="" type="radio"/> | C | D | E | 77. | A | B | C | <input checked="" type="radio"/> | E |
| 58. | A | <input checked="" type="radio"/> | C | D | E | 78. | A | <input checked="" type="radio"/> | C | D | E |
| 59. | A | B | C | <input checked="" type="radio"/> | E | 79. | A | B | C | <input checked="" type="radio"/> | E |
| 60. | <input checked="" type="radio"/> | B | C | D | E | 80. | A | B | <input checked="" type="radio"/> | D | E |
| 61. | <input checked="" type="radio"/> | B | C | D | E | 81. | A | <input checked="" type="radio"/> | C | D | E |
| 62. | A | <input checked="" type="radio"/> | C | D | E | 82. | A | <input checked="" type="radio"/> | C | D | E |
| 63. | A | B | <input checked="" type="radio"/> | D | E | 83. | A | B | <input checked="" type="radio"/> | D | E |
| 64. | A | B | C | <input checked="" type="radio"/> | E | 84. | A | B | C | D | <input checked="" type="radio"/> |
| 65. | A | B | C | <input checked="" type="radio"/> | E | 85. | <input checked="" type="radio"/> | B | C | D | E |
| 66. | A | B | <input checked="" type="radio"/> | D | E | 86. | A | <input checked="" type="radio"/> | C | D | E |
| 67. | A | B | C | <input checked="" type="radio"/> | E | 87. | A | B | <input checked="" type="radio"/> | D | E |
| 68. | A | B | <input checked="" type="radio"/> | D | E | 88. | A | B | C | <input checked="" type="radio"/> | E |
| 69. | <input checked="" type="radio"/> | B | C | D | E | 89. | A | B | C | <input checked="" type="radio"/> | E |
| 70. | A | <input checked="" type="radio"/> | C | D | E | 90. | <input checked="" type="radio"/> | B | C | D | E |