Kansas City Area Teachers of Mathematics
2014 KCATM Math Competition

GEOMETRY
GRADE 7

INSTRUCTIONS

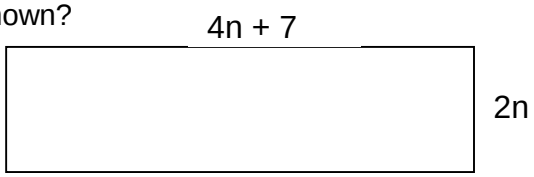
- **Do not open this booklet** until instructed to do so.

- Time limit: **20 minutes**
- You **may use calculators**.
- Mark your answer on the answer 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 _____

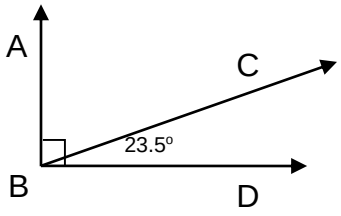
School _____

51. What is the area of the rectangle shown?



A. 6n + 7 B. 12n + 14 C. 8n + 14n
D. $8n^2 + 14n$ E. None of the above

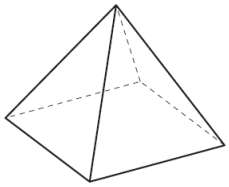
52. What is the measure of $\angle ABC$?



A. 23.5°
B. 57.5°
C. 66.5°
D. 67.5°
E. None of the above

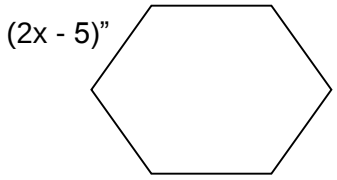
53. Which one of the following is **NOT** equivalent to 2.5 kg?
A. 2,500 grams B. 25 decagrams C. 2,500,000 milligrams
D. 25,000 decigrams E. None of the above

54. In the rectangular pyramid below, what shape is a face of the pyramid?
A. triangle
B. trapezoid
C. rhombus
D. square
E. None of the above



55. Which of these is the unit of measure of the **length** of a soccer field?
A. grams B. meters C. liters
D. square units E. None of the above

56. What is the **perimeter of a regular hexagon** when all sides measure (2x - 5) inches?

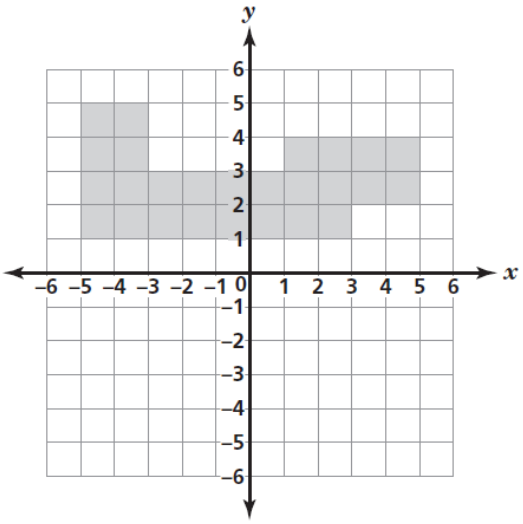


A. (12x - 5) inches
B. (6x -15) inches
C. $(4x^2 – 20x + 25)$ inches
D. (12x - 30) inches
E. None of the above

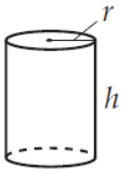
57. If the **area** of the rectangular garden shown is 60 sq. feet. If the length is twice the width, what is the length of the garden?
A. 10 ft. .
B. 20 ft.
C. 30 ft.
D. 60 ft.
E. None of the above

58. What is the area of the shaded region on the coordinate grid

A. 27 sq. units .
B. 28 sq. units.
C. 30 sq. units
D. 32 sq. units
E. None of the above



Use the formulas below for problems 59-61.

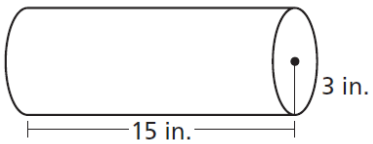


Right Circular Cylinder

Total Surface Area $= 2\pi rh + 2\pi r^2$

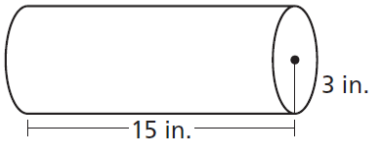
Volume $= \pi r^2 h$

59. What is the **volume** of the cylinder shown to the nearest tenth of an inch?



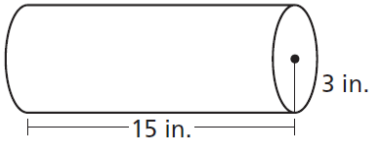
A. 424.1 cu. inches
B. 424.1 sq. inches
C. 282.7 cu. inches
D. 282.7 sq. inches
E. None of the above

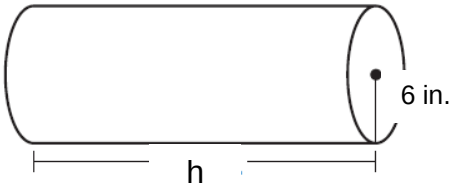
60. What is the **total surface area** of the cylinder to the nearest tenth of an inch?



A. 15,988.8 sq. inches
B. 339.3 sq. inches
C. 565.5 sq. inches
D. 5089.4 sq. inches
E. None of the above

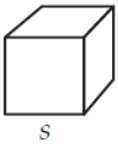
61. What is the **height** of a cylinder that is similar to the cylinder below when the radius is 6 in.?





A. 7.5 in. B. 21 in. C. 30 in. D. 45 in. E. None of the above

Use the following formulas for 62-64.



Cube

Total Surface Area = $6s^2$

Volume = s^3

62. Find the volume of a cube with side lengths of 7 cm.
A. 21 cm B. 21 cm^2 C. 21 cm^3 D. 343 cm^3 E. None of the above

63. If the surface area is 216 sq. meters, what is the side length of the cube?
A. 5 m B. 6 m C. 7 m D. 8 m E. None of the above

64. What is the expression for the total surface area of a cube with side lengths of (x + 3)?
A. 6x + 18 B. $6x^2 + 54$ C. $6x^2 + 18$
D. $6x^2 + 36x + 54$ E. None of the above

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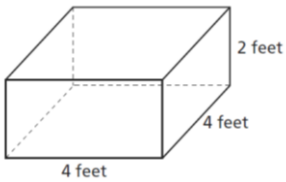
65. In a pie chart, a section that represents 30% of the circle is what degree?
A. 30º B. 54º C. 108º D. 130º E. None of the above

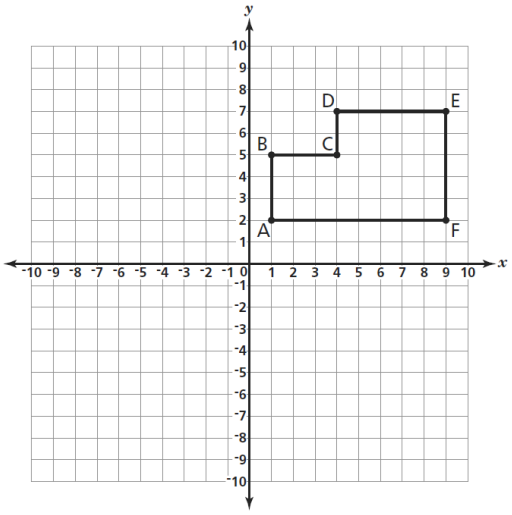
66. Which statement is true about the faces of the rectangular prism below?



A. All faces are squares.
B. Two of the faces are squares.
C. Four of the faces are squares.
D. None of the faces are squares.
E. None of the above

67. If you use 5.5 liters of water in your fountain, how many milliliters is this?
A. 55 B. 550 C. 5,500 D. 55,000 E. None of the above

68. If you reflected the figure below over the y-axis, what would be the point of reflection for C? how did it is affect the **NOT** have the same perimeter?



A. (-4, 5)

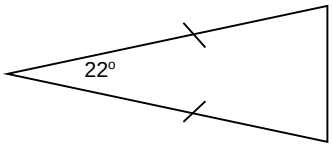
B. (5, 4)

C. (4 , -5)

D. (-5 , -4)

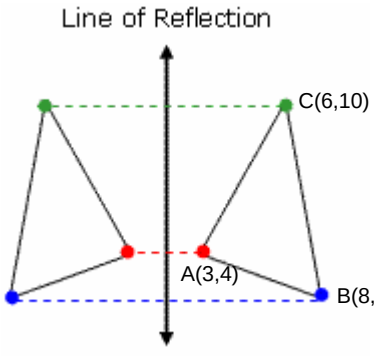
E. None of the above

69. Given the isosceles triangle and the vertex angle measure, find the measure of **each base angle.**



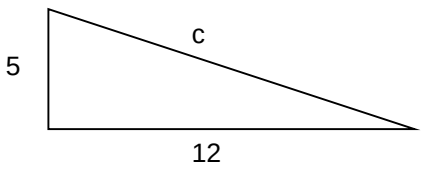
A. 78°
B. 158°
C. 76°
D. 79°
E. None of the above

70. If the **line of reflection is the y-axis**, what would be the coordinates of the **reflected** Pt. A?



A. (3 , 4)
B. (-8, 2)
C. (-3, 4)
D. (3, -4)
E. None of the above

71. Given the 2 sides of a triangle below, **which value of "c" would give you a <u>right</u> triangle?**



A. 7
B. 13
C. 15
D. 17
E. None of the above

72. Given a rectangle, which shape would be formed if you spin the rectangle one full rotation on one of its sides?
A. cylinder B. rectangle C. sphere D. prism E. None of the above

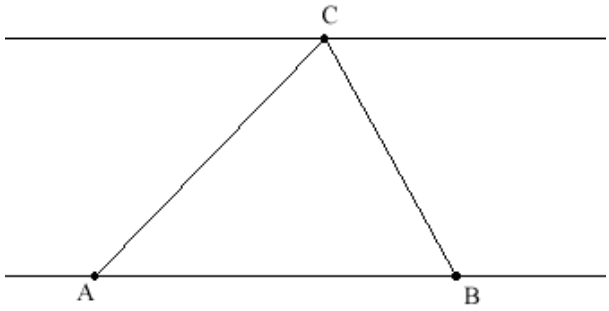
73. If the circumference of a circle is 12π cm, what is the length of the radius?
A. 5 cm B. 6 cm C. 8 cm D. 12 cm E. None of the above

74. Find the area of a circle if the diameter is 20 yards. Round your answer to the nearest tenth.
A. 31.4 yd^2 B. 62.4 yd^2 C. 314.2 yd^2
D. 628.3 yd^2 E. None of the above

75. What is the measure of the supplement of an angle measuring 64°?
A. 64° B. 27° C. 36° D. 116° E. None of the above

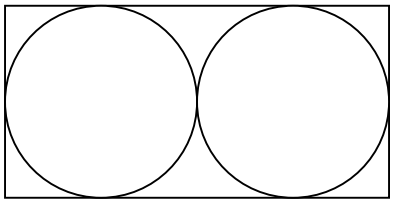
76. Use the distance formula: $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ to find the distance between the points (2, 3) to (5, 7).
A. 5 units B. 6 units C. 7 units D. 8 units E. None of the above

77. Given the triangle formed between the 2 parallel lines, if you move the vertex C along the top line, what affect does moving vertex C have on the area of the triangle when you leave the base length of AB untouched?



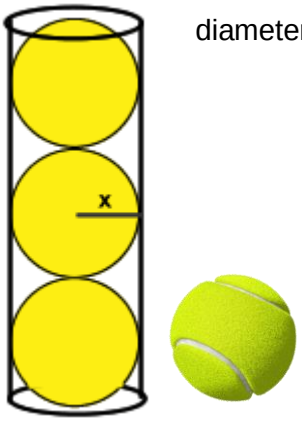
A. The area varies with each movement of the vertex C.
B. The area is always ½ of the original area when vertex C is moved.
C. The area is doubled when vertex C is moved.
D. The area stays the same when vertex C is moved.
E. None of the above

78. Given the rectangular paper that is 12" by 24" with the 2 circles cut from the paper as shown below, to the nearest square inch how **much paper is wasted** when the circles are cut from the paper?



A. 61.8 sq. in.
B. 175.9 sq. in.
C. 212.6 sq. in.
D. 106.3 sq. in.
E. None of the above

79 . Given the diagram of a can of tennis balls and one tennis ball, **which length is greater**?



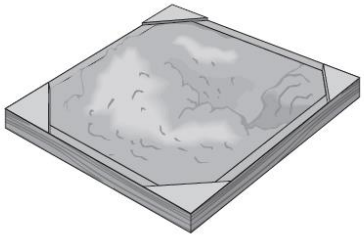
diameter = 67 mm

A. The height of the cylinder
B. The circumference of the tennis ball
C. The diameter of cylinder
D. The radius of the tennis ball
E. None of the above

80. Which has the greatest area, a square pizza with 10inch sides or a round pizza with a diameter of 12 inches? To the nearest square inch, by how much is it greater?

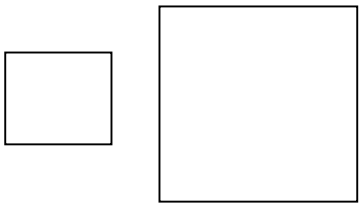
A. Square pizza by 3.5 sq. inches
B. Square pizza by 13 sq. inches
C. Circular pizza by 352 sq. inches
D. Circular pizza by 13 sq. inches
D. None of the above

81. You use 4 cubic yards of sand in the sandbox below. How many cubic feet do you use?



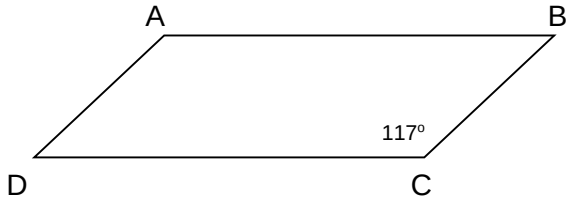
A. 12 cu. ft.
B. 36 cu. ft.
C. 108 cu. ft.
D. 64 cu. ft.
E. None of the above

82. The areas of the two squares below are 4 and 36 respectively. What is the ratio of their sides?



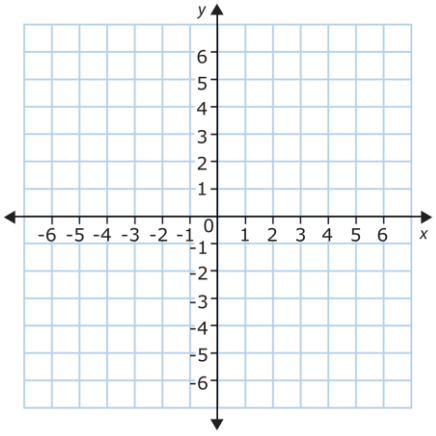
A. 2:18
B. 1:9
C. 1:6
D. 4:36
E. None of the above

83. What would be the measure of $\angle A$ in the parallelogram ABCD?



A. 53°
B. 117°
C. 243°
D. 63°
E. None of the above

84. Find the area of a circle with center at the origin that goes through the point (0,-7). Round your answer to the nearest tenth.



A. 44.0 sq. units

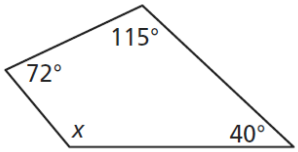
B. 22.0 sq. units

C. 124.7 sq. units

D. 153.9 sq. units

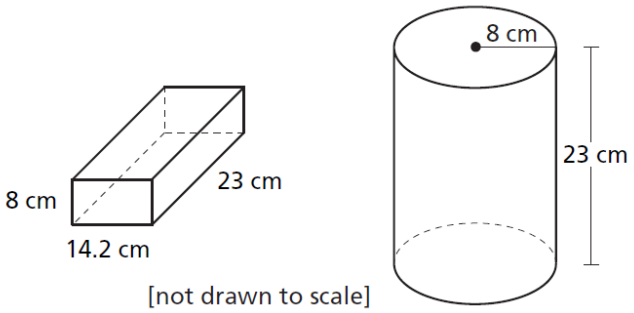
E. None of the above

85. What is the measure of the missing angle in the quadrilateral below?



A. 133°
B. 123°
C. 113°
D. 143°
E. None of the above

86. You want to purchase a container for beads. You are debating over the two shapes below. What is the difference in volumes of the rectangular prism and the cylinder to the nearest tenth?



A. 2011.6 cu. cm

B. 2612.8 cu. cm

C. 4624.4 cu. cm

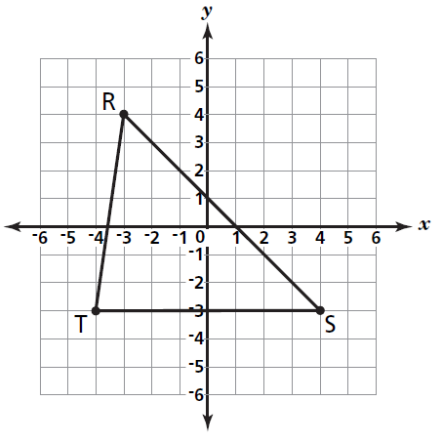
D. 2034.7 cu. cm

E. None of the above

Formulas: $V = lwh$

$V = \pi r^2 h$

87. What is the **area** of the triangle below? ***Formula: A = ½ bh***



A. 43 sq. units

B. 27 sq. units

C. 28 sq. units

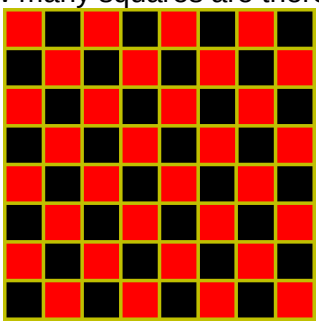
D. 51 sq. units

E. None of the above

88. How many sides does a dodecagon have?

A. 8 B. 10 C. 12 D. 15 E. None of the above

89. How many squares are there on a checker board?



A. 204
B. 64
C. 128
D. 81
E. None of the above

90. Which shape has no vertices?

A. triangular pyramid B. rectangular C. cone D. sphere E. None of the above

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 ● C D E

Name_____

School _____

Answer Key

51. A B C ● E
52. A B ● D E
53. A ● C D E
54. ● B C D E
55. A ● C D E
56. A B C ● E
57. A B C D ●
58. A B C D ●
59. ● B C D E
60. A ● C D E
61. A B ● D E
62. A B C ● E
63. A B ● D E
64. A B C ● E
65. A B ● D E
66. A ● C D E
67. A B ● D E
68. ● B C D E
69. A B C ● E
70. A B ● D E
71. A ● C D E
72. A ● C D E
73. A ● C D E
74. A B ● D E
75. A B C ● E
76. ● B C D E
77. A B C ● E
78. ● B C D E
79. A ● C D E
80. A B C ● E
81. A B ● D E
82. A B C D ●
83. A ● C D E
84. A B C ● E
85. ● B C D E
86. ● B C D E
87. A B ● D E
88. A B ● D E
89. ● B C D E
90. A B C ● E