

Kansas City Area Teachers of Mathematics
2013 KCATM Math Competition

**GEOMETRY AND MEASUREMENT TEST
GRADE 6**

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 or 3.14159 on your calculator.
- The pictures in the figures are “not-to-scale.”

Area Formulas:

Triangle	$A = \frac{1}{2} bh$
Parallelogram	$A = bh$
Trapezoid	$A = \frac{1}{2} h (b_1 + b_2)$

Volume Formulas:

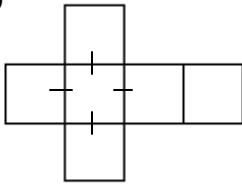
Rect. Prism	$V = l \times w \times h$
Cylinder	$V = \pi r^2 h$

Student Name _____ Student Number _____

School _____

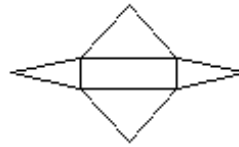
Identify each solid given its net.

51)



- A) pentagonal pyramid
- B) triangular prism
- C) square prism
- D) rectangular pyramid
- E) None of the above

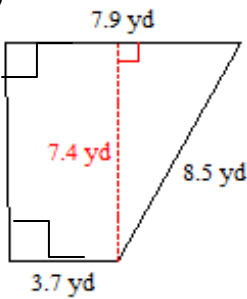
52)



- A) square prism
- B) cylinder
- C) hexagonal pyramid
- D) rectangular pyramid
- E) None of the above

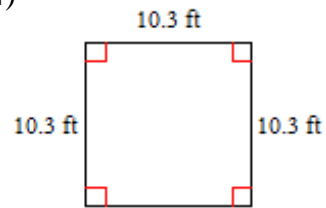
Find the area of each.

53)



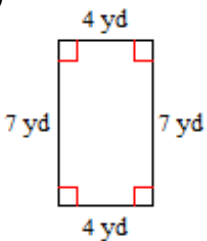
- A) 85.84 yd²
- B) 42.92 yd²
- C) 40.22 yd²
- D) 21.5 yd²
- E) None of the above

54)



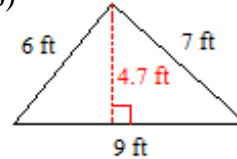
- A) 115.49 ft²
- B) 106.09 ft²
- C) 212.18 ft²
- D) 53 ft²
- E) None of the above

55)



- A) 14 yd²
- B) 28 yd²
- C) 33.8 yd²
- D) 56 yd²
- E) None of the above

56)

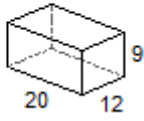


- A) 38.3 ft²
- B) 21.15 ft²
- C) 19.15 ft²
- D) 42.3 ft²
- E) None of the above

Which net matches the sketch of the solid?

Which sketch of a solid matches the net?

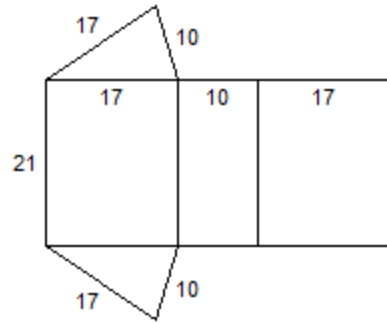
57)



- A)
- B)
- C)
- D)

E) None of the above

58)

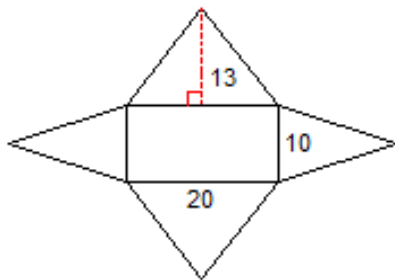


- A)
- B)
- C)
- D)

E) None of the above

Which sketch of a solid matches the net?

59)

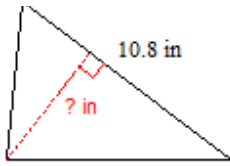


- A)
- B)
- C)
- D)

E) None of the above

Find the missing measurement. Round your answer to the nearest tenth.

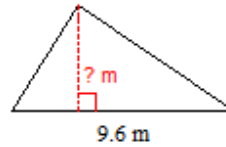
60)



Area = 30.2 in^2

- A) 4 in
- B) 3.4 in
- C) 4.9 in
- D) 5.6 in
- E) None of the above

61)

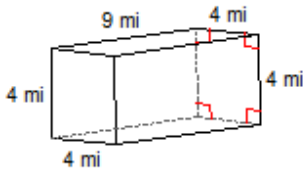


Area = 22.1 m^2

- A) 5.3 m
- B) 5.8 m
- C) 4.6 m
- D) 5.7 m
- E) None of the above

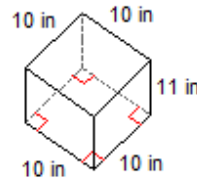
Find the volume of each figure.

62)



- A) 148 mi^3
- B) 130 mi^3
- C) 144 mi^3
- D) 81 mi^3
- E) None of the above

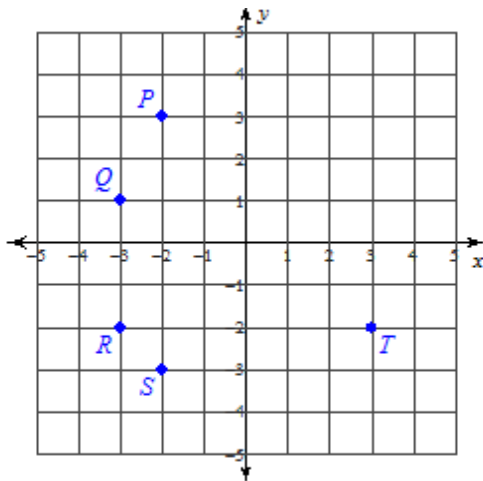
63)



- A) 1100 in^3
- B) 1340 in^3
- C) 1463 in^3
- D) 689 in^3
- E) None of the above

Use the coordinate plane for problems #64-68.

64) Identify the label of the point plotted at $(-3, -2)$.



- A) Point T
- B) Point S
- C) Point R
- D) Point Q
- E) None of the above

65) What is the name of the figure PQRS?
 A) Parallelogram B) Right Triangle
 C) Trapezoid D) Rectangle
 E) None of the above

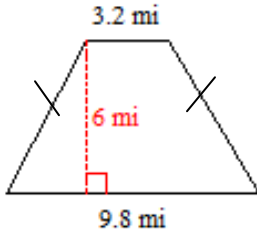
66) Plot pt. U $(0, -2)$. What would be the coordinates of Pt. V if you created a square QRUV?
 A) $(0, -3)$ B) $(0, 1)$
 C) $(1, 0)$ D) $(3, 1)$
 E) None of the above

67) What is the perimeter of the square in #16?
 A) 18 units B) 8 units
 C) 6 units D) 9 units
 E) None of the above

68) What is the area of the square in #16?
 A) 18 sq. units B) 8 sq. units
 C) 12 sq. units D) 9 sq. units
 E) None of the above

Use the figure below for problems 69 – 71.

69)



- A) 39 mi^2
- B) 19.5 mi^2
- C) 78 mi^2
- D) 36.4 mi^2
- E) None of the above

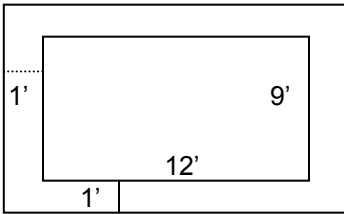
70) Name the outside figure in #69.

- A) Rectangle
- B) Parallelogram
- C) Rhombus
- D) Isosceles Trapezoid
- E) None of the above

71) Decompose the figure. Which statement is true?

- A) Two right triangles with base 9.8mi and height 6 mi.; 1 rectangle with base 3.2mi and height 6 mi.
- B) Two right triangles with base 3.3mi and height 6 mi.; 1 rectangle with base 3.2mi and height 6 mi.
- C) Two parallelograms with base 3.3 and height 6 mi.; 1 triangle with base 3.2mi and height 6 mi.
- D) Three isosceles triangles with base 3.2mi and height 6 mi.
- E) None of the above

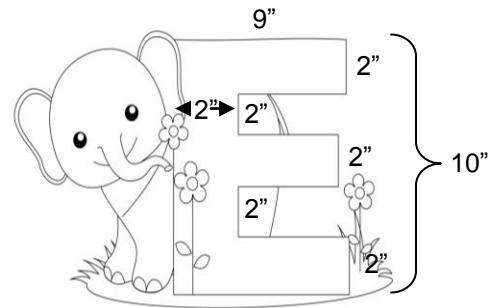
72) A border is 1 ft. wide surrounds all sides of a rectangular garden that is 9 ft. by 12 ft. What is the area of the border?



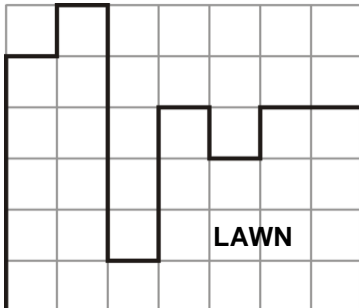
- A) 46 sq. ft.
- B) 130 sq. ft.
- C) 154 sq. ft.
- D) 50 sq. ft.
- E) None of the above

73) You are making a large letter **E** out for your little sister’s preschool class so they can study words that begin with **E** like elephant as in the picture. Find the **area** of the letter E.

- A) 90 sq. in.
- B) 58 sq. in.
- C) 62 sq. in.
- D) 76 sq. in.
- E) None of the above



74) You want to earn extra money mowing lawns. You decide to charge \$1 for every 10 sq. yards. If the lawn is the shape in the figure on the grid, how **much would you charge** this customer? The width of each square grid space is 12 ft.



- A) \$432.00
- B) \$43.20
- C) \$83.33
- D) \$57.60
- E) None of the above

Use the Campbell's soup can shown for problems 75-76.

75) You are making a design for art class that uses the labels on Campbell's soup cans. If the height of the can is 10 cm (1 decimeter) and the circumference of the can is 20.4cm, **what is the area of the label?**

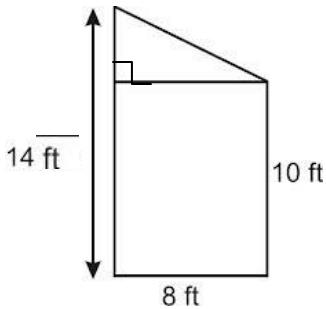


- A) 35.17 cm²
- B) 64.96 cm²
- C) 2.04 cm²
- D) 204 cm²
- E) None of the above

76) If the area of the base is 33.2 sq. cm and the height of the can is 10 cm, what is the **volume** of the can? *The volume formula is $V = Bh$, where $B = \text{area of the base}$, $h = \text{height}$.*

- A) 332 cm³
- B) 166 cm³
- C) 33.2 cm³
- D) 3,320 cm³
- E) None of the above

77) You drew the design below to represent half the east side of your house. You want to paint the full side, and this symmetric design will help you find the area. What is the **area of the east side** of your house?

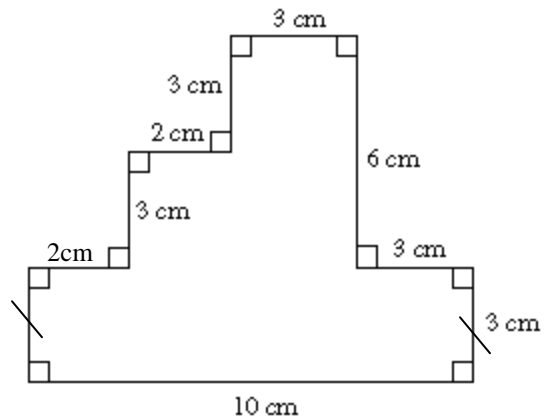


- A) 176 sq. ft.
- B) 170 sq. ft.
- C) 192 sq. ft.
- D) 86 sq. ft.
- E) None of the above

Use the figure below for problems 78-79.

78) What is the perimeter?

- A) 33 cm
- B) 30 cm
- C) 38 cm
- D) 42 cm
- E) None of the above



79) What is the area of the figure?

- A) 90 cm²
- B) 38 cm²
- C) 63 cm²
- D) 54 cm²
- E) None of the above

80) How many 6" square tiles would it take to cover the rectangular shaped backsplash of your kitchen counter that measures 8 ft. by 2.5 ft on one wall and 6 ft by 2.5 ft. on a second wall?

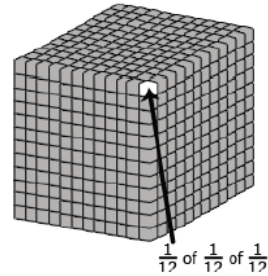
- A) 210 tiles B) 140 tiles
- C) 350 tiles D) 35 tiles
- E) None of the above



81) A rectangular solid is made of smaller unit cubes with sides $\frac{1}{12}$ the length of the side of the rectangular solid (see diagram). What is the volume of the rectangular solid?

Volume formula: $V = l \times w \times h$

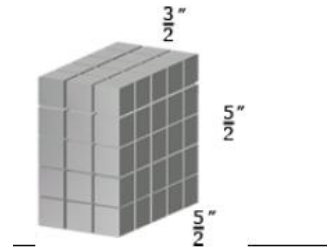
- A) 1,000 cubic units B) 5,184 cubic units
- C) 1,728 cubic units D) 144 cubic units
- E) None of the above



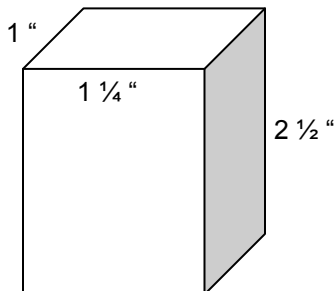
82) What is the volume of the rectangular prism below?

Volume formula: $V = l \times w \times h$

- A) 9.375 in^3 B) 6.5 in^3
- C) 20 in^3 D) 75 in^3
- E) None of the above



83) A right rectangular prism has edge lengths of $1 \frac{1}{4}$ ", 1", and $2 \frac{1}{2}$ ". How many $\frac{1}{4}$ " cubes can be placed inside this prism?



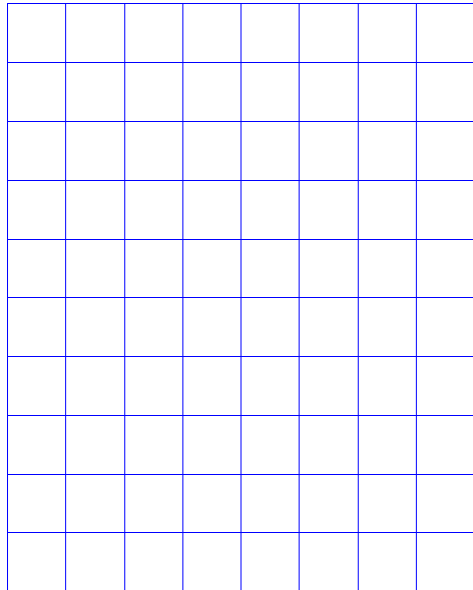
- A) 180 cubes B) 50 cubes
- C) 220 cubes D) 200 cubes
- E) None of the above

84) A rectangle measures 5 units by 11 units. If the dimensions are tripled, what effect does this have on the area?

- A) tripled B) mult. by 9 C) mult. by 27 D) mult. by 36 E) None of the above

Use the information below for problems 85-88.

On a map, the library is located at (-2, 2), the city hall building is located at (0, 2), and the high school is located at (0,0). Represent the locations as points on a coordinate grid with a unit of a mile.



85) What is the distance from the library to the city hall building?

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

86) What is the distance from the library to the high school to the nearest hundredth.

- A) 2.83 mi. B) 3.12 mi. C) 2.97 mi.
- D) 2.47 mi. E) None of the above

87) What shape does connecting the three locations form?

- A) Scalene triangle B) Trapezoid
- C) Rhombus D) Right Isosceles Triangle
- E) None of the above

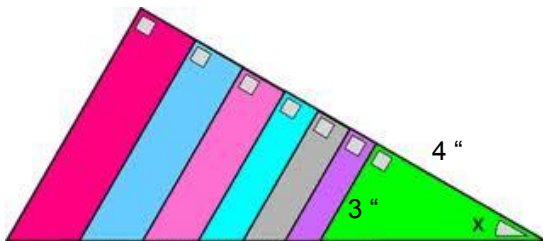
88) If the city council wants to build a city park in this area formed by the points above, how large would be the area of the city park?

- A) 2 sq. mi. B) 3 sq. mi. C) 4 sq. mi. D) 6 sq. mi. E) None of the above

Use the triangle figure for problems 89-90.

89) A foldable designed with 7 right triangles of different colors is shown. If the smallest triangle has a short leg of 3" and a long leg of 4". Every consecutive triangle is 1/2" longer than the previous length of the long leg side of 4" (2nd triangle: long leg = 4.5"; 3rd triangle = 5", etc.).

How long is the short leg of the largest triangle? Hint: Use ratios to find the short side.



- A) 6 in B) 5.25 in
- C) 6.25 in D) 5.75 in
- E) None of the above

90) What is the hypotenuse length of the largest triangle in the design above?

- A) 8.75 in. B) 8.25 in. C) 7.75 in. D) 8.50 in. 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 KEY51. A B C D E52. A B C D E53. A B C D E54. A B C D E55. A B C D E56. A B C D E57. A B C D E58. A B C D E59. A B C D E60. A B C D E61. A B C D E62. A B C D E63. A B C D E64. A B C D E65. A B C D E66. A B C D E67. A B C D E68. A B C D E69. A B C D E70. A B C D E71. A B C D E72. A B C D E73. A B C D E74. A B C D E75. A B C D E76. A B C D E77. A B C D E78. A B C D E79. A B C D E80. A B C D E81. A B C D E82. A B C D E83. A B C D E84. A B C D E85. A B C D E86. A B C D E87. A B C D E88. A B C D E89. A B C D E90. A B C D E