

Kansas City Area Teachers of Mathematics
2015 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:

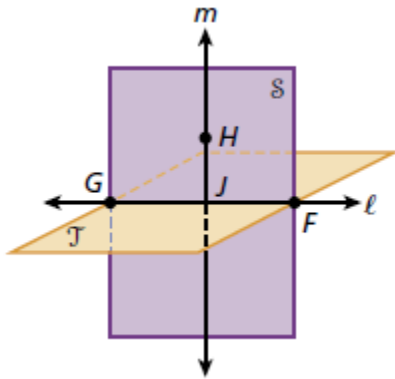
Rect. Prism	$V = lwh$
Cylinder	$V = \pi r^2 h$

Student Name _____ Student Number _____

School _____

- 51) Which of the following *approximate* measurements is **least likely** to be reasonable?
- A) An American football field is approximately 100 meters.
 - B) A doorknob is placed on a door approximately 1 meter from the floor.
 - C) An average sixth grader is approximately 200 cm tall.
 - D) A paper clip is approximately 2 cm in length.
 - E) None of the above
- 52) What is the best estimate for the capacity of a teaspoon?
- A) 5 milliliters B) 1 liter C) 500 milliliters D) 0.5 liters E) Not given
- 53) What is the best estimate for the mass of a bowling ball?
- A) 200 grams B) 7 kilograms C) 70 kilograms D) 500 grams E) Not given
- 54) Given the approximate measure of 1 inch being equal to 2.54 cm, convert 100 cm into inches.
- A) 254 inches B) 39.4 inches C) 42.1 inches D) 25.4 inches E) Not given

Use the diagram below to answer questions 55 and 56.

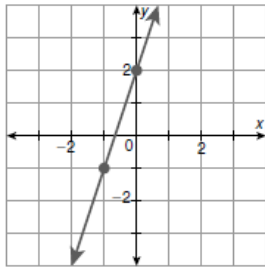


- 55) Name a line that intersects with Plane T.
- A) \overleftrightarrow{GF} B) \overleftrightarrow{HJ} C) \overleftrightarrow{JF} D) line l
 - E) None of the above
- 56) Name the intersection of Plane S and Plane T
- A) \overleftrightarrow{GF} B) \overleftrightarrow{HJ} C) \overleftrightarrow{JH} D) line m
 - E) None of the above

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

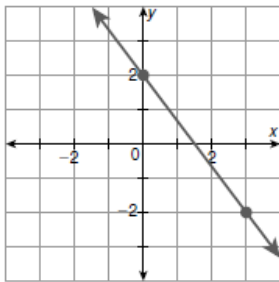
- 57) Last season, Graham Zusi made a goal in almost every Sporting KC soccer game. The new season is beginning, so Zusi will make a goal in every game.
- A) Inductive B) Deductive
- 58) Matt Besler graduated from BV West. He played soccer at Notre Dame before getting selected in the 2009 draft to play for Sporting KC Soccer Club. This year Matt will play for Sporting KC.
- A) Inductive B) Deductive

Use the coordinate graph below for problems 59 and 60.

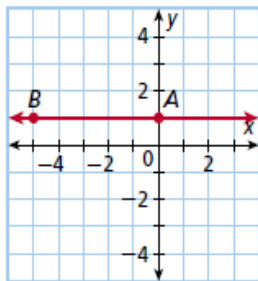


- 59) What is the **slope** of the line shown?
 A) 1 B) 1/3 C) -3/1 D) 3/1
 E) None of the above

- 60) What is the slope of a line perpendicular to the line segment shown?
 A) -1/3 B) 1/3 C) -3 D) 3
 E) None of the above

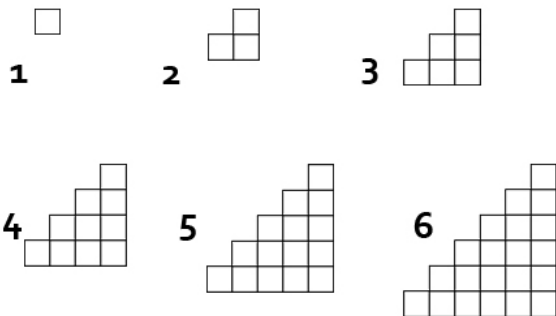


- 61) What is the **linear equation** for the line?
 A) $y = -\frac{3}{2}x + 2$ B) $y = -\frac{4}{3}x + 2$
 C) $y = -\frac{3}{4}x + 2$ D) $y = -\frac{2}{3}x + 2$
 E) None of the above



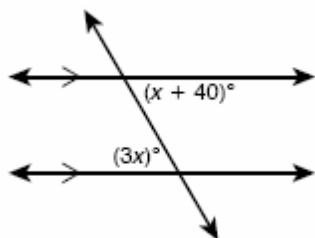
- 62) What is the **linear equation** for the line?
 A) $y = 0$ B) $x = 1$
 C) $y = 1$ D) $y = -1x + 1$
 E) None of the above

63) How many squares would be in the **10th figure**?



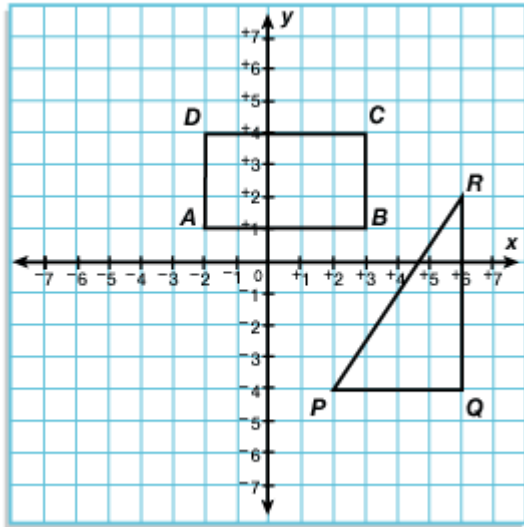
- A) 28 B) 55 C) 66 D) 36
 D) None of the above

64) Find the value of x:

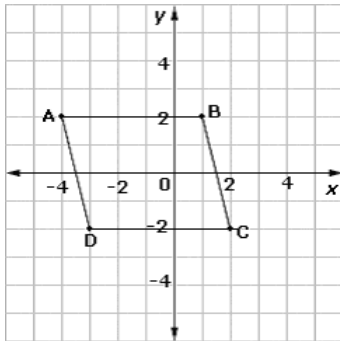


- A) $x = 20$ B) $x = 50$ C) $x = 60$
 D) $x = 10.3$ E) None of the above

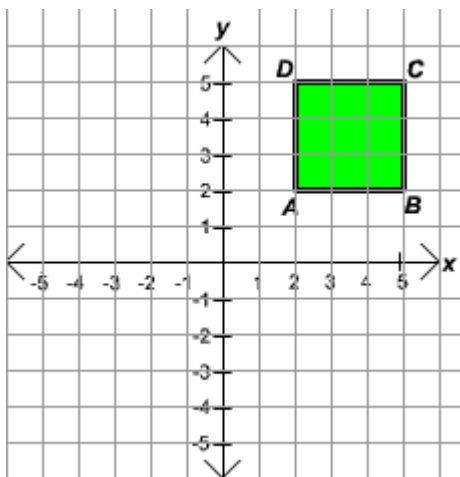
Use the coordinate graph below for problems 65 through 67.



- 65) What is the perimeter of the rectangle?
 A) 15 units B) 8 units C) 24 units
 D) 20 units E) None of the above
- 66) What is the area of the triangle?
 A) 15 units² B) 12 units² C) 24 units²
 D) 20 units² E) None of the above
- 67) What is the **ratio** of the area of the triangle to the area of the rectangle?
 A) 5:4 B) 8:5 C) 5:6
 D) 4:5 E) None of the above

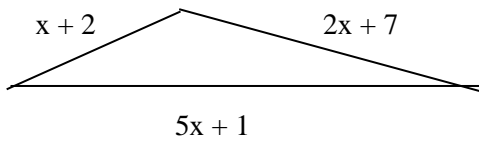


- 68) What is the area of the parallelogram?
 A) 25 sq. units B) $5\sqrt{17}$ sq. units
 C) 20 sq. units D) 24 sq. units
 E) None of the above



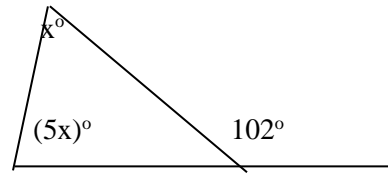
- 69) Reflect the square over the x axis. What are the **new** coordinates?
 A) A'(2,-2), B'(5,-2), C'(5,-5), D'(2,-5)
 B) A'(-2, 2), B'(-6, 2), C'(-6, 5), D'(-2,5)
 C) A'(-2,-2), B'(-5,-2), C'(-5,-5), D'(-2,-5)
 D) A'(2,-2), B'(5,-2), C'(5,-5), D'(2,-5)
 E) None of the above

70) Perimeter = 34 Find x.



- A) 2.25
- B) 3
- C) 2.5
- D) 4
- E) None of the above

71) Find x.



- A) 2.25
- B) 3
- C) 2.5
- D) 4
- E) None of the above

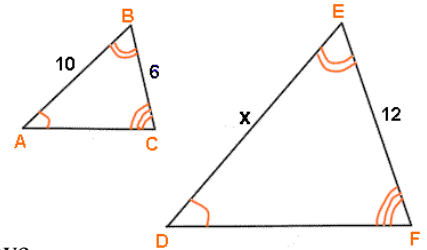
Solve the proportion:

72) $\frac{2x+5}{3} = \frac{3}{5}$

- A) -0.5
- B) -2
- C) -1.6
- D) 0.4
- E) None of the above

Use the similar triangles to find x:

73)



- A) 14
- B) 15
- C) 16
- D) 17
- E) None of the above

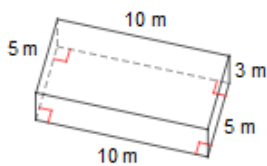
Volume Formulas:

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

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

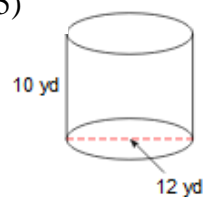
Find the volume of each figure. Round your answers to the nearest hundredth, if necessary.

74)



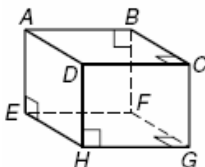
- A) 189 m^3
- B) 150 m^3
- C) 128 m^3
- D) 147 m^3
- E) None of the above

75)



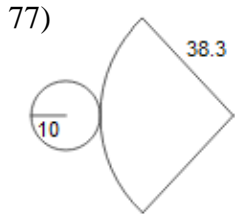
- A) 1557.26 yd^3
- B) 4523.89 yd^3
- C) 639.78 yd^3
- D) 1130.97 yd^3
- E) None of the above

76) Given the rectangular solid below, what type of line segments are \overline{EH} and \overline{DH} ?

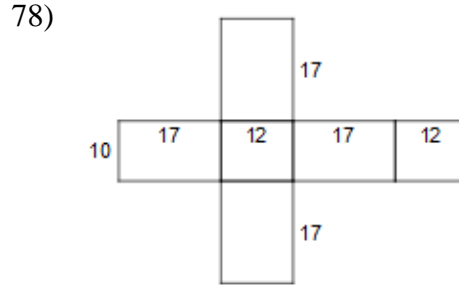


- A) Perpendicular
- B) Parallel
- C) Skew
- D) Vertical
- E) None of the above

Which sketch of a solid matches the net?

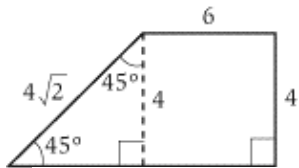


- A) B) C) D)



- A) B) C) D)

79) Find the area of the trapezoid.

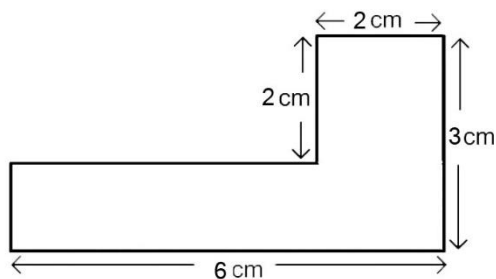


- A) 24 sq. units B) 24.5 sq. units
 C) 32 sq. units D) 26 sq. units
 E) None of the above

80) A triangle has a perimeter 13. The two shorter sides have integer lengths equal to x and $x + 1$. What could be the lengths of the three sides of the triangle?

- A) 1, 6, 6 B) 3, 4, 6 C) 5, 6, 2 D) 4, 5, 3 E) None of the above

Use the figure for problems 81 and 82.

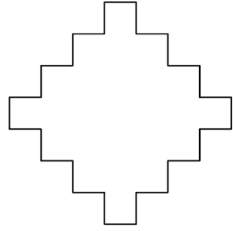


81) Find the **perimeter**.

- A) 13 cm B) 14 cm C) 17 cm
 D) 18 cm E) None of the above

82) Find the **area**.

- A) 10 cm^2 B) 24 cm^2 C) 18 cm^2
 D) 22 cm^2 E) None of the above

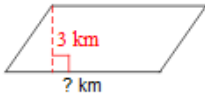


83) Each segment is perpendicular to the adjacent segment. If each line segment is 1 unit in length, what is the area of the figure?

- A) 32 sq. units
- B) 25 sq. units
- C) 26 sq. units
- D) 31 sq. units
- E) None of the above

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

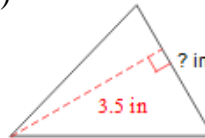
84)



Area = 21 km²

- A) 4.7 km
- B) 7 km
- C) 5.3 km
- D) 6.1 km

85)



Area = 5.3 in²

- A) 2.4 in
- B) 3 in
- C) 3.2 in
- D) 2.2 in

86) If you ride in a 1-mile race on your bicycle with 26" diameter wheels, what is the best estimate of how many times one tire will rotate during the race? Round to the nearest whole number. 1 mile = 5,280 ft.

- A) 776 rotations
- B) 119 rotations
- C) 1551 rotations
- D) 65 rotations
- E) None of the above



Use the “aluminum cans recycling project” approximate measures for problems 87-90. Approximate measures:

- one can weighs 20 grams
- height is 12.5 cm
- diameter is 6.4 cm

87) What is the **circumference** of one can using $d = 6.4$ cm

- A) 10.1 cm
- B) 20.1 cm
- C) 40.2 cm
- D) 32.2 cm
- E) Not given

88) What is the **surface area** of a single can if the formula is: $SA = Ch + 2B = \pi dh + 2\pi r^2$

- A) 315.6 cm²
- B) 508.6 cm²
- C) 760.0 cm²
- D) 261.4 cm²
- E) Not given

89) If the surface area of a can has a weight of 20 grams, what is the **weight of aluminum per sq. cm?**

- A) 0.026 grams/sq. in.
- B) 0.039 grams/sq. in.
- C) 0.063 grams/sq. in.
- D) 0.077 grams/sq. in.
- E) None of the above

90) If each can weighs 20 grams and 105,800 cans are recycled every minute, **how many kilograms are recycled every minute?**

- A) 2,116,000 kg
- B) 21,160 kg
- C) 211.6 kg
- D) 2,116 kg
- E) Not given

<http://www.cancentral.com/recycling-sustainability/facts>



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 - 3-26-15 cvb

51. A B ● D E

52. ● B C D E

53. A ● C D E

54. A ● C D E

55. A ● C D E

56. ● B C D E

57. ● B C D E

58. A ● C D E

59. A B C ● E

60. ● B C D E

61. A ● C D E

62. A B ● D E

63. A ● C D E

64. ● B C D E

65. A B C D ●

66. A ● C D E

67. A B C ● E

68. A B ● D E

69. A B C ● E

70. A ● C D E

71. A B C D ●

72. A B ● D E

73. A B C D ●

74. A ● C D E

75. A B C ● E

76. ● B C D E

77. A B C ● E

78. A ● C D E

79. A B ● D E

80. A ● C D E

81. A B C ● E

82. ● B C D E

83. A ● C D E

84. A ● C D E

85. A ● C D E

86. ● B C D E

87. A ● C D E

88. ● B C D E

89. A B ● D E

90. A B C ● E