

Kansas City Area Teachers of Mathematics
2015 KCATM Math Competition

GEOMETRY
GRADE 7

INSTRUCTIONS

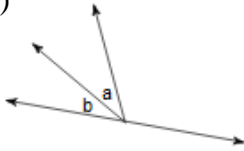
- **Do not open this booklet** until instructed to do so.
- Time limit: **20 minutes**
- You **may use calculators**.
- Mark your answer on the answer sheet by **FILLING in the oval**.
- You **may not use rulers, protractors, or other measurement devices** on this test.
- Letter **“E” is “None of the above”**. It is a correct answer for some of the problems.
- **Use the π key on your calculator**.

Student Name _____ Student Number _____

School _____

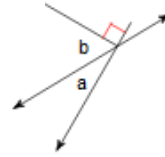
Name the relationship: complementary, linear pair, vertical, or adjacent.

51)



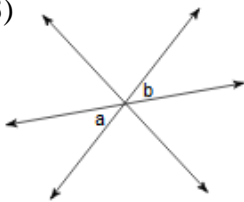
- A) linear pair
- B) alternate interior
- C) adjacent
- D) corresponding
- E) None of the above

52)



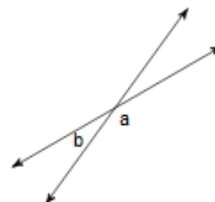
- A) alternate interior
- B) vertical
- C) corresponding
- D) complementary
- E) None of the above

53)



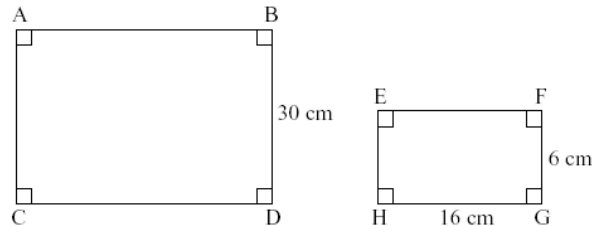
- A) linear pair
- B) adjacent
- C) vertical
- D) corresponding
- E) None of the above

54)



- A) complementary
- B) linear pair
- C) alternate exterior
- D) corresponding
- E) None of the above

Use the similar rectangles for problems 55-58.



55) Find **CD**, the length of the first rectangle.

- A) 40 cm
- B) 150 cm
- C) 80 cm
- D) 96 cm
- E) None of the above

56) What is the ratio of the **width** of rectangles **to the length** of the rectangles?

- A) 1:4
- B) 3:8
- C) 3:4
- D) 1:5
- E) None of the above

57) What is **the ratio of the perimeters** of the similar rectangles (small:large)?

- A) 1:5
- B) 3:8
- C) 1:25
- D) 3:10
- E) None of the above

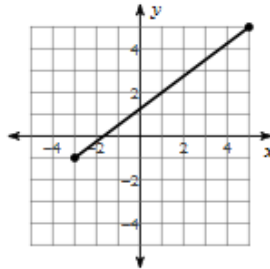
58) What is **the ratio of the areas** of the similar rectangles (small:large)?

- A) 3:8
- B) 9:64
- C) 1:5
- D) 1:25
- E) None of the above

59) On a map, 2.5 inches represents 100 miles. What is the scale factor?

- A) 1:4 B) 1:40 C) 50:1 D) 1:50 E) None of the above
-

Use the line segment on the coordinate plane for problems 60-62.



60) What is the **slope** of the line segment?

- A) $3/4$ B) $4/3$ C) $-3/4$ D) $-4/3$ E) None of the above

61) What is the **distance** of the line segment? Distance formula: $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

- A) 9 units B) 10 units C) 12 units D) 14 units E) None of the above

62) Use the segment in the diagram to identify which equation in **point-slope form** is correct.

- A) $y - 3 = 2/3(x + 1)$ B) $y + 3 = 3/4(x + 1)$ C) $y - 5 = -3/4(x - 5)$
D) $y + 5 = 4/3(x + 5)$ E) None of the above
-

63) **Find the circumference** of a circle with radius 5 cm. Round your answer to the nearest tenth.

- A) 15.7 cm B) 7.9 cm C) 5 cm D) 31.4 cm E) None of the above

64) Given the **circumference** of a circle is 153.94 meters, **what would be the diameter?**

- A) 15.39 m B) 49.0 m C) 51.3 m D) 31.4 m E) None of the above

65) **What is the area** of a circle with radius 8.4 miles? Round to the nearest tenth of a mile.

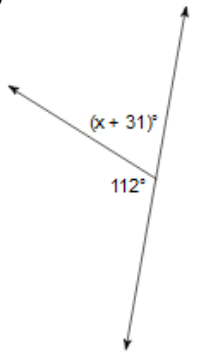
- A) 221.7 sq. miles B) 52.8 sq. miles C) 82.9 sq. miles D) 840 sq. miles
E) None of the above

66) **What is the volume** of a cube with side measure 9 cm?

- A) 54 sq. cm B) 216 cu. cm C) 729 cu. cm D) 486 cu. cm
E) None of the above

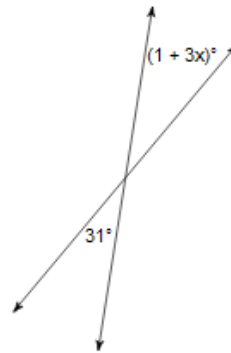
Find the value of x .

67)



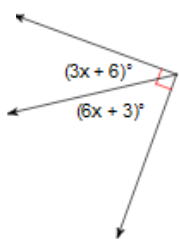
- A) 37 B) 36
C) 34 D) 31

68)



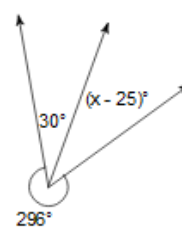
- A) 19 B) 10
C) 14 D) 16

69)



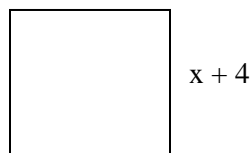
- A) 12 B) 6
C) 11 D) 9

70)



- A) 62 B) 57
C) 61 D) 59

71) What is the **area of the square** shown?



- A) $4x + 16$ B) $4x + 8$ C) $x^2 + 16$
D) $x^2 + 8x + 16$ E) None of the above

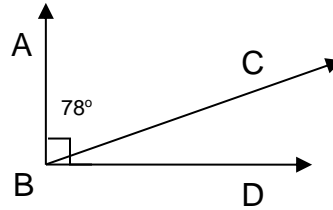
72) What is the **perimeter of the rectangle** below given that the length is twice the width?



- A) $4x + 20$ B) $6x + 30$ C) $4x + 30$
D) $4x^2 + 20$ E) None of the above

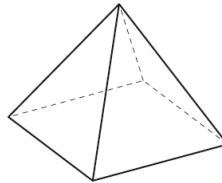
73) What is the **measure** of $\angle DBC$?

- A) 22°
- B) 13°
- C) 12°
- D) 102°
- E) None of the above

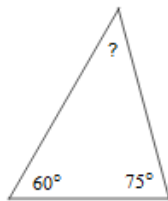


74) You **slice** through the square pyramid parallel to the base. **What shape is the surface of the slice?**

- A) triangle
- B) trapezoid
- C) rhombus
- D) square
- E) None of the above

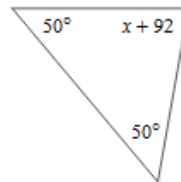


75) Solve for the unknown angle.



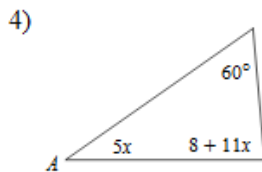
- A) 40°
- B) 46°
- C) 45°
- D) 52°

76) Solve for x.



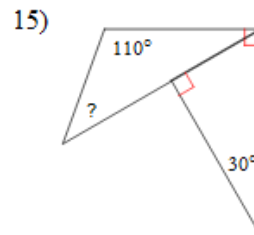
- A) -6
- B) 1
- C) 7
- D) -12

77) Solve for the measure of $\angle A$.



- A) 85°
- B) 38°
- C) 35°
- D) 31°

78) Solve for ?.



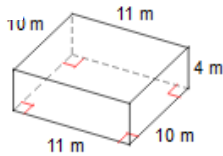
- A) 160°
- B) 40°
- C) 39°
- D) 45°

79) **Which image is created** when you spin a scalene right triangle about one of its legs?

- A) Cone
- B) Circle
- C) Sphere
- D) Rectangle
- E) None of the above

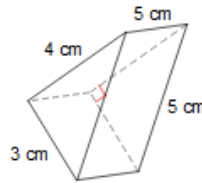
Find the surface area of each figure. Round your answers to the nearest tenth, if necessary.

80)



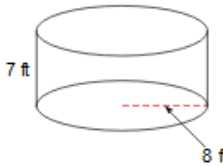
- A) 498 m^2
- B) 342 m^2
- C) 388 m^2
- D) 278 m^2

81)



- A) 72 cm^2
- B) 80 cm^2
- C) 66 cm^2
- D) 56 cm^2

82)

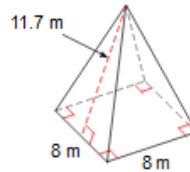


$$SA = Ch + 2B$$

C = circumference
B = area of Base

- A) 754 ft^2
- B) 726.1 ft^2
- C) 1073.4 ft^2
- D) 706.3 ft^2

83)



$$SA = \frac{1}{2}Pl + B$$

P = perimeter of base
l = slant height
B = area of Base

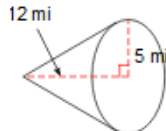
- A) 289.5 m^2
- B) 232.6 m^2
- C) 251.2 m^2
- D) 236.1 m^2

Volume Formulas:

Rect. Prism	$V = lwh$	Cone	$V = \frac{1}{3}\pi r^2 h$
Cylinder	$V = \pi r^2 h$	Sphere	$V = \frac{4}{3}\pi r^3$

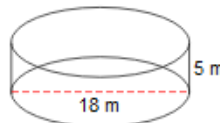
Find the volume of each figure. Round your answers to the nearest hundredth, if necessary.

84)



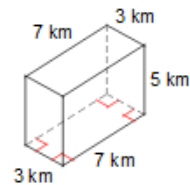
- A) 314.16 mi^3
- B) 380.64 mi^3
- C) 352.41 mi^3
- D) 270.43 mi^3

85)



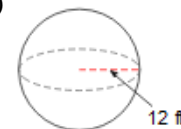
- A) 1611.02 m^3
- B) 1272.35 m^3
- C) 5089.38 m^3
- D) 901.69 m^3

86)



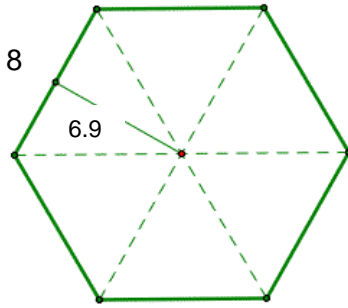
- A) 53 km^3
- B) 105 km^3
- C) 140 km^3
- D) 78 km^3

87)



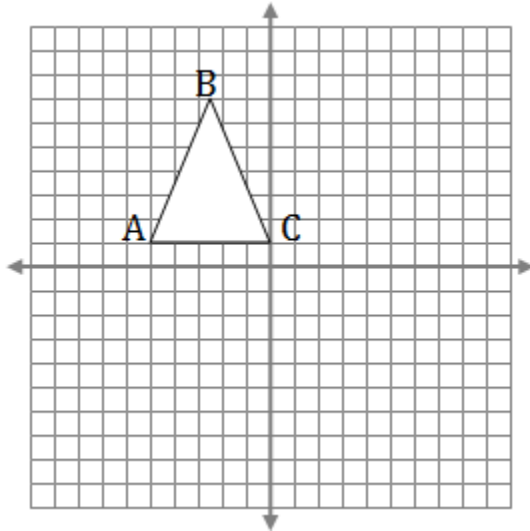
- A) 7238.23 ft^3
- B) 5263.51 ft^3
- C) 3842.65 ft^3
- D) 6654.33 ft^3

88) What is the **area of a regular hexagon** when given the side length of 8m and the height of each equilateral triangle within the regular hexagon of 6.9m?



- A) 41.4 sq. meters
- B) 27.6 sq. meters
- C) 110.4 sq. meters
- D) 165.6 sq. meters
- E) None of the above

Use the triangle on the coordinate plane for problems 89 and 90.



89) Find the **area** of the triangle.

- A) 15 sq. units
- B) 30 sq. units
- C) 48.5 sq. units
- D) 12.5 sq. units
- E) None of the above

90) **Reflect the triangle over the vertical axis.** Name the image coordinates.

- A) $A'(-5, -1), B'(-2.5, -7), C'(0, -1)$
- B) $A'(5, 0), B'(2.5, 6), C'(0, 0)$
- C) $A'(5, -1), B'(2.5, -7), C'(1, 0)$
- D) $A'(5, 1), B'(2.5, 7), C'(0, 1)$
- 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 – 3.19.15 JH

51. A B ● D E

52. A B C ● E

53. A B ● D E

54. A ● C D E

55. A B ● D E

56. A ● C D E

57. ● B C D E

58. A B C ● E

59. A ● C D E

60. ● B C D E

61. A ● C D E

62. A ● C D E

63. A B C ● E

64. A ● C D E

65. ● B C D E

66. A B ● D E

67. ● B C D E

68. A ● C D E

69. A B C ● E

70. A B C ● E

71. A B C ● E

72. A ● C D E

73. A B ● D E

74. A B C ● E

75. A B ● D E

76. A B C ● E

77. A B ● D E

78. A ● C D E

79. ● B C D E

80. A B ● D E

81. ● B C D E

82. ● B C D E

83. A B ● D E

84. ● B C D E

85. A ● C D E

86. A ● C D E

87. ● B C D E

88. A B C ● E

89. ● B C D E

90. A B C ● E