

Kansas City Area Teachers of Mathematics
2015 KCATM Math Competition

GEOMETRY
Grade 8

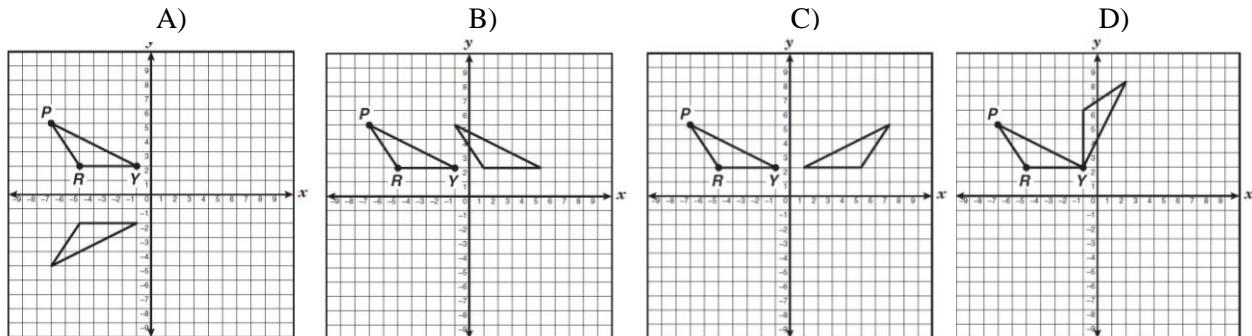
INSTRUCTIONS

- **Do not open this booklet** until instructed to do so.
- Time limit: **20 minutes**
- You **may use calculators**.
- Mark your answer on the Scantron 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 _____

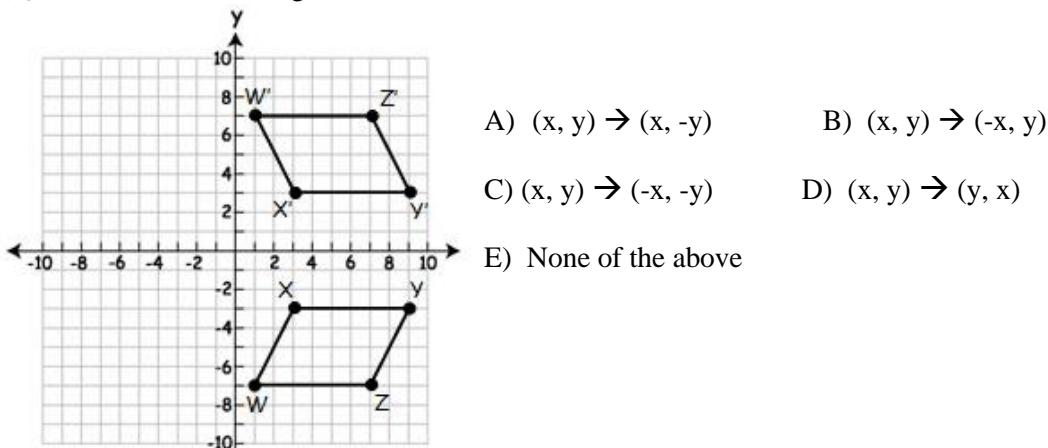
School _____

- 51) $\triangle PRY$ is reflected across the y -axis. Which of the following shows this transformation?

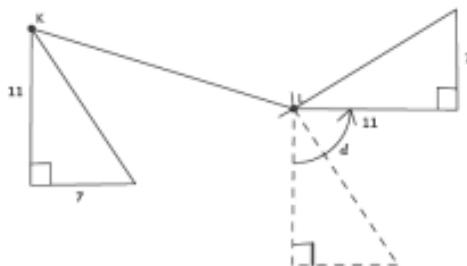


E) None of the above

- 52) Given the rigid transformation below, what would the rule be from the coordinates of the pre-image (Quadrant IV) to the image.



- 53) What is the correct sequence of rigid transformations shown in the diagram?

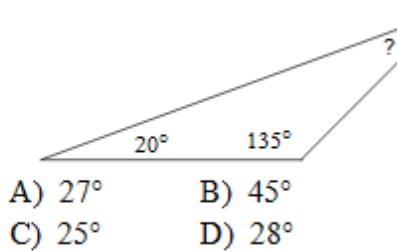


- A) Translation, 90° clockwise rotation.
 C) Translation, 90° counter-clockwise rotation.
 E) None of the above
- B) 90° counter-clockwise rotation, translation
 D) Reflection, translation, reflection

- 54) Which of the following is NOT a Pythagorean Triple?

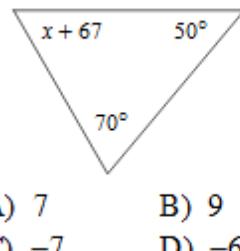
- A) 7, 24, 25 B) 5, 12, 13 C) 6, 8, 10 D) 9, 41, 42
 E) All are Pythagorean Triples

55) Solve for the missing angle.



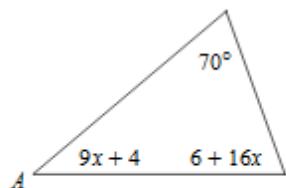
- A) 27° B) 45°
C) 25° D) 28°

56) Solve for x .



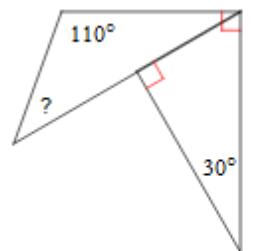
- A) 7 B) 9
C) -7 D) -6

57) Solve for $m\angle A$.



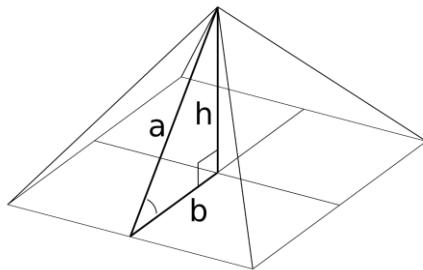
- A) 43° B) 40°
C) 120° D) 70°

58) Solve for ?



- A) 160° B) 40°
C) 39° D) 45°

Use the diagram of the square pyramid with base sides 6 and height of 4 for problems 59 and 60.



59) What is the length of “ a ”, the **lateral height** of the pyramid?

- A) 6 B) 5 C) 4 D) 7 E) None of the above

60) What is the **surface area** of the square pyramid?

$$\text{SA} = \frac{1}{2} Pa + B \quad (\text{B} = \text{area of the base}, P = \text{perimeter of the base})$$

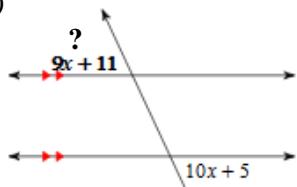
- A) 96 sq. units B) 120 sq. units C) 132 sq. units D) 126 sq. units E) None of the above

61) What is the **volume** of the pyramid? $V = \frac{1}{3} Bh$ ($B = \text{area of the base}$)

- A) 40 cu. units B) 60 cu. units C) 144 cu. units D) 48 cu. units E) None of the above

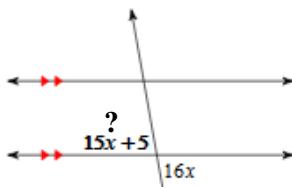
Find the measure of the angle indicated in bold. The ? is placed in the angle that is bolded.

62)



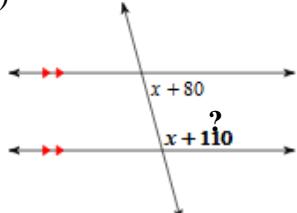
- A) 60° B) 73°
C) 85° D) 65°

63)



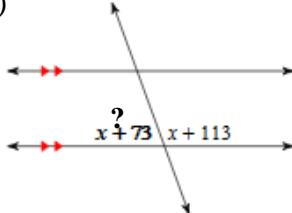
- A) 80° B) 98°
C) 75° D) 60°

64)



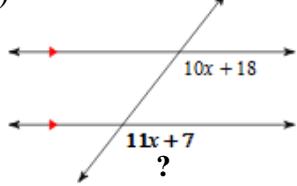
- A) 125° B) 115°
C) 75° D) 105°

65)



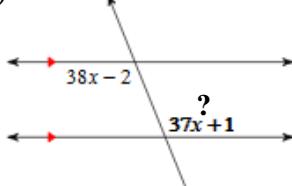
- A) 70° B) 55°
C) 58° D) 45°

66)



- A) 128° B) 40°
C) 60° D) 106°

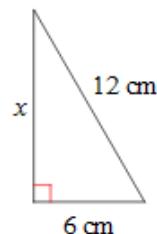
67)



- A) 115° B) 125°
C) 130° D) 112°

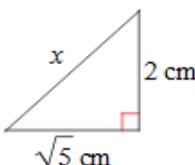
Find the missing side of each triangle. Leave your answers in simplest radical form.

68)



- A) $6\sqrt{2}$ cm B) $6\sqrt{7}$ cm
C) $6\sqrt{3}$ cm D) $6\sqrt{5}$ cm

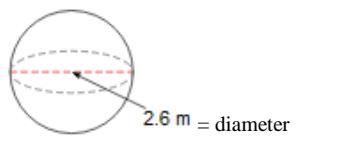
69)



- A) $\sqrt{13}$ cm B) $\sqrt{14}$ cm
C) 1 cm D) 3 cm

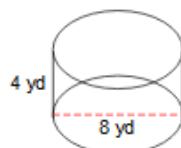
Find the volume of each figure. Round your answers to the nearest hundredth, if necessary.

70)



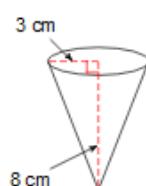
- A) 15.36 m^3 B) 73.62 m^3
C) 6.2 m^3 D) 9.2 m^3

71)



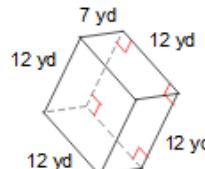
- A) 141.5 yd^3 B) 804.25 yd^3
C) 201.06 yd^3 D) 231.82 yd^3

72)



- A) 52.02 cm^3 B) 90.73 cm^3
C) 40.91 cm^3 D) 75.4 cm^3

73)



- A) 833 yd^3 B) 1008 yd^3
C) 1091 yd^3 D) 533 yd^3

Volume Formulas:

Sphere:

$$V = \frac{4}{3}\pi r^3$$

Cylinder:

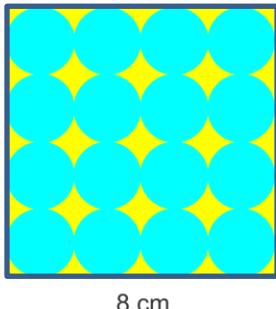
$$V = \pi r^2 h$$

Cone:

$$V = \frac{1}{3}\pi r^2 h$$

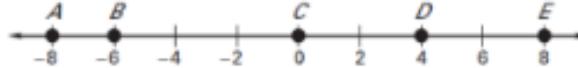
74) What is the geometric probability (to the nearest thousandth) of landing in one of the tangent circles inside the square? Each side of the square is tangent to the outside circles.

8 cm



- A) 0.947 B) 0.846 C) 0.979 D) 0.785
E) None of the above

Use the following diagram for problems 75-76.



75) What is the probability of landing on \overline{BC} on \overline{AE} ?

- A) $3/8$ B) $3/16$ C) $3/4$ D) $1/3$ E. None of the above

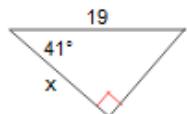
76) What is the ratio of: $AC:CD$

- A) $1:2$ B) $4:1$ C) $1:4$ D) $2:1$ E. None of the above

77) If the tangent ratio of an acute angle in a right triangle is $2/5$, what is the angle measure to the nearest degree?

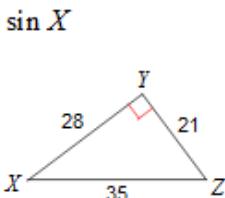
- A. 25° B. 24° C. 22° D. 66° E. None of the above

- 78) Use trigonometry to find the side length to the nearest tenth.



- A) 17.9 B) 25.2
C) 11.2 D) 14.3

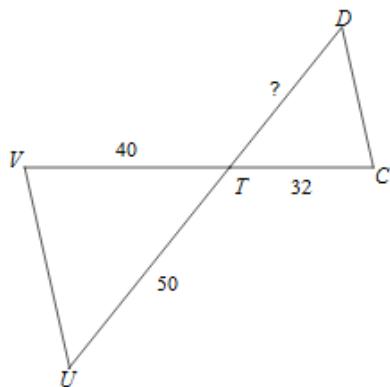
- 79) Given the right triangle XYZ, find $\sin X$.



- A) $\frac{3}{4}$ B) $\frac{5}{4}$
C) $\frac{4}{3}$ D) $\frac{3}{5}$

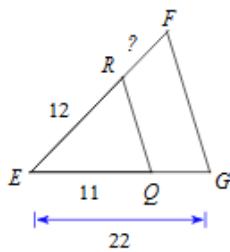
Find the missing length. The triangles in each pair are similar.

80)



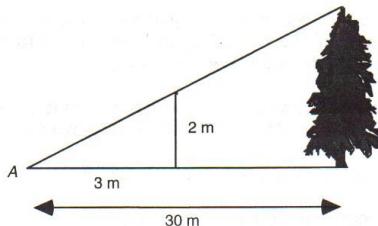
- A) 60 B) 58
C) 40 D) 21

81)



- A) 18 B) 15
C) 8 D) 12

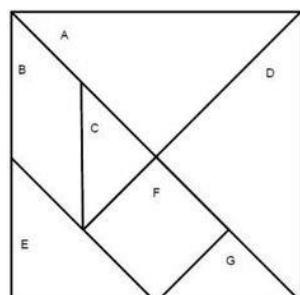
- 82) How tall is the tree?



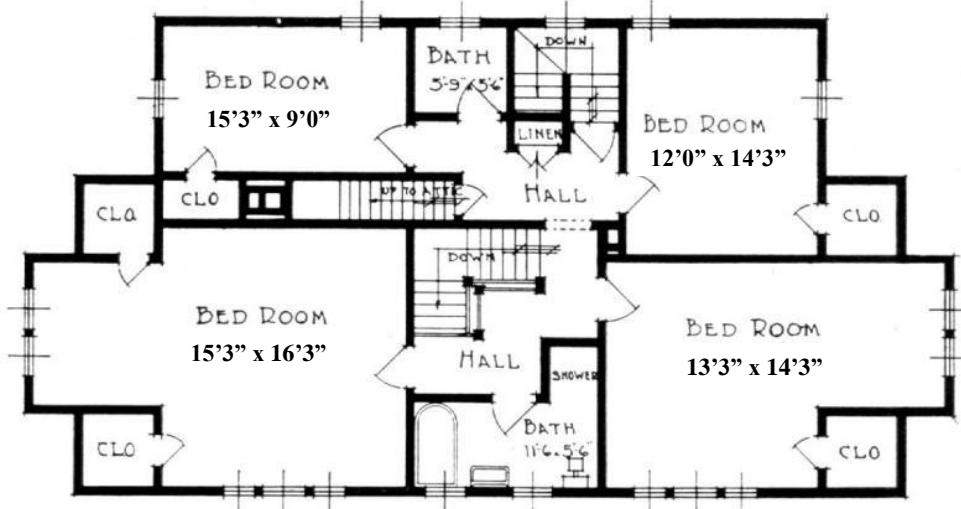
- A) 20 meters B) 60 meters C) 60 meters D) 75 meters E) None of the above

- 83) Given the tangram figure, what is the ratio of Figure B to the whole square?

- A) 1/6 B) 1/4 C) 1/8 D) 1/16
E) None of the above



Use the house plans with the dimensions given for problems 84-85.

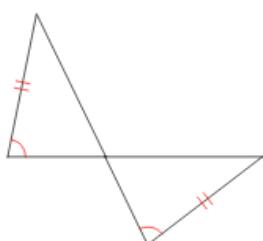


Bathroom A:
5'9" x 5'6"
Bathroom B:
11'6" x 5'6"

- 84) What is the **area of the smallest bedroom?** **Do NOT round** your answers.
- A) 171 sq. ft. B) 137.25 sq. ft. C) 137.7 sq. meters D) 63.25 sq. meters E) None of the above
- 85) What is the area of the larger bathroom? **Do NOT round** your answers. (*See dimensions above.*)
- A) 33.04 sq. ft. B) 31.625 sq. ft. C) 64.96 sq. meters D) 63.25 sq. meters E) None of the above
- 86) A medium pizza has a diameter of 12". A large pizza has a diameter of 16". **Which one is the better buy** if the medium costs \$7.00 and the large costs \$10.00 **and by how much per square inch** (nearest thousandths)
- A) Large by 0.003 B) Large by 4.000 C) Small by 0.050 D) Small by 0.003
E) None of the above
- 87) Simplify $4\sqrt{18} - 3\sqrt{2}$
- A. $9\sqrt{2}$ B. $5\sqrt{3}$ C. $4\sqrt{2}$ D. 16 E. None of the above

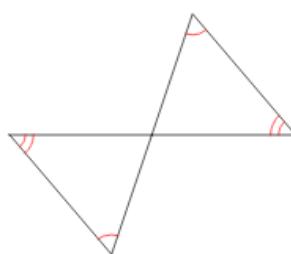
State if the two triangles are congruent. If they are, state how you know.

88)



- A) AAS
B) ASA
C) HL
D) Not congruent

89)



- A) HL
B) Not congruent
C) SAS
D) SSS

- 90) If the long leg of a 30-60-90 is 12, what is the length of the short leg?

- A. $3\sqrt{3}$ B. $6\sqrt{3}$ C. 6 D. $4\sqrt{3}$ E. None of the above

Shade the correct answer!Name _____
Example: A C D E

School _____

51. A B C D E

71. A B C D E

52. A B C D E

72. A B C D E

53. A B C D E

73. A B C D E

54. A B C D E

74. A B C D E

55. A B C D E

75. A B C D E

56. A B C D E

76. A B C D E

57. A B C D E

77. A B C D E

58. A B C D E

78. A B C D E

59. A B C D E

79. A B C D E

60. A B C D E

80. A B C D E

61. A B C D E

81. A B C D E

62. A B C D E

82. A B C D E

63. A B C D E

83. A B C D E

64. A B C D E

84. A B C D E

65. A B C D E

85. A B C D E

66. A B C D E

86. A B C D E

67. A B C D E

87. A B C D E

68. A B C D E

88. A B C D E

69. A B C D E

89. A B C D E

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