Geometry 80 **State Mathematics Contest Finals** May 5, 2005

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1. Given the conditional statement: "If two lines are parallel, then the lines do not withthe start to the intersect." Which of the following conditionals is equivalent to the given statement? mistilute ####

"If two lines do not intersect, then the lines are parallel." a.

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- "If two lines intersect, then the lines are not parallel." b.
- c. "If two lines are not parallel, then the lines intersect."
- "If two lines are not parallel, then the lines do not intersect." d.
- 2. What is the area of an equilateral triangle inscribed in a circle of radius 4 cm? mistinte to the

d. $12\sqrt{3} \ cm^2$ c. $12\sqrt{2} \ cm^2$ e. $16\sqrt{3} \ cm^2$ b. $16 \ cm^2$ a. $12 \ cm^2$

matture ## # 13 PR 3. In the diagram, ABCD is a parallelogram, and BFDE is a square. If AB = 20 cmmutitute 300 X and $CF = 16 \ cm$, what is the perimeter of the parallelogram ABCD?

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a. 72 cm c. 86 cm d or b., 78 cm d. 92*cm*

a. 20%

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b. 25%

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d. 56.25%

5. Three sides of a regular hexagon, no two of which share a vertex of the hexagon, are

c. 36%

c. $\frac{5}{2}$

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extended to form a triangle. The perimeter of the triangle thus formed is how many times the perimeter of the original hexagon?

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6. In $\triangle ABC$ shown, D is some interior point, and x, y, z, w are the measures of the indicated angles in degrees. Solve for x in terms of y, z, and w.

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7. Given three segments of length x, 11 - x, and x - 4, respectively. Which of the following indicates the set of all numbers x such that the three segments could be the lengths of the sides of a triangle?

d. 5 < x < 7b. 0 < x < 11c. 4 < x < 11e. 5 < x < 11a. x > 4

obtuse triangle? 8. Which of the following sets of triples could <u>not</u> be the lengths of the sides of an minitule # # 'E なるな to the the

9. A 25-foot ladder is placed against a vertical wall of a building. The foot of the ladder is 7 feet from the base of the building. If the top of the ladder slips 4 feet down the Withte the the the wall, how far will the foot of the ladder slide away from the wall?

b. 5 feet c. 8 feet d. 9 feet a. 4 feet

10. A rhombus is formed by two radii and two chords of a circle whose radius is 16 cm. Find the area of the rhombus.

a.
$$128 \ cm^2$$
 b. $128\sqrt{3} \ cm^2$ c. $256 \ cm^2$ d. $256\sqrt{3} \ cm^2$ e. None of these

- 面前加加斯林塔 11. The line through points (m, -9) and (7, m) has slope m. What is the y-intercept of this line?
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c. 0, 6 d. 6 e. 18 b. -6 -18

a. $2\frac{2}{3}$ feet b. $3\frac{2}{5}$ feet c. $3\frac{1}{2}$ feet d. $4\frac{2}{3}$ feet e. $4\frac{4}{5}$ feet

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加频 法资源 Astitute ## # 3 a. 12. A small tree 5 feet from a lamp post casts a shadow 4 feet long. If the lamp post were 2 feet higher, the shadow would only be 3 feet long. How tall is the tree?

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multille m # * Institute m X 3 Institute m # " multinu m # 3 multinu m # 3 matitute # # 3 stitute # # 3 PE Y. 26. $\triangle ABC$ is a right triangle with hypotenuse AB and AC = 15 cm. Altitude CH tinstitute ## divides AB into segments AH and HB, with HB = 16 cm. Find the area of ΔABC . C a. $120 \ cm^2$ c. 150 cm² Withte # # 12 PR WHE WAY WE nte the e. None of these A Η B Y. 27. A pentagon is formed by cutting a triangular corner from a rectangular piece of tinstitute ## # paper. The five sides of the pentagon have lengths 13, 19, 20, 25, and 31, although this is not necessarily their order around the pentagon. Find the area of the pentagon. a. 459 sq. units b. 600 sq. units c. 680 sq. units d. 720 sq. units e. 745 sq. units mutute # # 3 PC 28. Let $\triangle ABC$ have vertices A(-4, -3), B(6, -1), and C(2, 5). Find the length of the Ro institute the the to \overline{AB} . b. $\sqrt{50}$ c. $\sqrt{53}$ d. $\sqrt{89}$ e. $\sqrt{104}$ median from C to \overline{AB} . a. $\sqrt{26}$ of the complement of the same angle. The sum is the measure of an interior angle of a regular nine-sided polygon. What is the measure of the supplement of the angle? Y. c. 90° a. 82° b. 86° d. 94° e. None of these 9 dm from the other wall as shown in the figure. What is the radius of the table? 11 *dm* a. b. $9\sqrt{2} dm$ Withit the the is the 加地新城塔像 Withte the the the c. $9\sqrt{3} dm$ N. Astitute the d. 17 dm P e、18 dm 而如此此称林塔张 Institute # # 18 而对加根教教学家 面的机能称样姿像 Astitute ## # 18 Y. to the the B. Ph to the the 'S Ph to the the the to the the By to the the the the to the W. B. Ro

of their common external tangents as shown. Find the radius of the third circle. 35. A circle centered at A with radius of 1 and a circle centered at B with radius of 4 matitule ## # 3

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e. 2.46π m

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e. None of these

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 $\frac{5}{12}$ c.

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- 而如此他称林塔梯 柳林場際 振冰海影 频法资料 36. A 400-meter race is to be run on a track that is 400 meters long when measured along the innermost lane. The track consists of straight parallel sides, semicircular ends, and eight running lanes, each 1.23 meters wide. How far forward should the starting positions in neighboring lanes be marked so that the distance run by each competitor mythille ## # 18 matinte # ** is the same? d. $1.23\pi m$
 - b. *π m* c. 2.46 *m* a. 1.23 m

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stakes that are 14 feet apart. My dog, Elvis, is tethered to the rope, but the tether is loose and slides freely along the rope between the stakes. 37. I have an unusual dog run in my yard. A 50-foot rope is tied at each end to two divitute # area of my yard that Elvis can reach. What is the area of the region that Elvis can reach?

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