GEOMETRY

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1. Consider 3 squares A, B, and C where the perimeter of square A is $\frac{2}{3}$ the perimeter of square B, and the perimeter of severe $P = \frac{2}{3}$ perimeter of square *B*, and the perimeter of square *B* is $\frac{2}{3}$ the perimeter of square *C*. If the area of square *A* is 16, what is the area of square *C*?

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 π^{2} b. $\sqrt{\pi}$ c. π .

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b. 36.

d. 72. e. 81.

a. $\frac{1}{\pi^2}$.

c. π . d. π^2 . e. $4\pi^2$.

mouthing the the 'S PR of the area of circle II to the area of circle I? 2. If the circumference of circle I is equal to the diameter of circle II, what is the ratio tinstitute ## the stille

3. If circle O has its center at (1,1) and line L is tangent to circle O at P(4,-4), what is the



the cube, what is the total area of the surface of the cube that is NOT red? a. 6π Astitute # # # 13 PR 4. A white cube has a volume of 27. If a red circle of radius 1 is painted on each face of

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b. 12*π*. c. $27 - 6\pi$. % d. $54 - 6\pi$.

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e. $54 - 12\pi$.

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- 山北新林道佛 加北新林荡隊 INTE WE HE BURN institute # 5. Suppose that the coordinates of A and D are (1,4) and (1,10) respectively and that ABCD forms a square with the x coordinate of B greater than 1. If F has coordinates (10,0), what is the area of $\triangle BFC$? mutute ## # '& R multile # # 13 PR 而此此他新祥後席 而如此他称林诺能
 - a. 6.
 - b. 9. 10 c. 10.
 - d. 14.
 - e. 18.

6. Suppose a rectangle has area 10 and a diagonal length $\sqrt{29}$. What is its perimeter?

- b. 16.
- c. 18.
- % d. 20. e. 22.

«"a. 15.

b. 18. c. 19.5 d. 37.5. e. 39.

a. 12. b. -14.

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加加林林塔林 加地频样谱像 mistille ### 7. Find the radius of a circle circumscribed about a triangle with sides of lengths 15, 36 and 39.

8. Consider the circles with radii $4\sqrt{5}$ and which are tangent to the line x - 2y = 20 at

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the point (6,-7). The sum of the *x* coordinates of the centers of the circles is

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 11. Jonathan walks completely around the boundary of a square whose sides are each 5 km long. From any point on his path he can see exactly 1 km horizontally in the directions. What is the area of the second secon during his walk, expressed in square kilometers and rounded to the nearest whole number? 而如此他教林後然 Induitable # ** ** 而此此他新祥後席 面的机能称样谱像 mstinte # # '\$ 1%

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- e. 42.
- 12. In a regular hexagon, the diagonals are increased by 30 percent. By what percentage Astitute \$ will the area of the hexagon increase as a result?
 - a. 30.
 - b. 40.
 - c. 46.
 - ou. e. 69. *******
- Institute the the " the " the Multille # # 'S PL Multille # # 3 PE Multille # # 3 K matitute ## # '\$ 13. A right triangle with integer side lengths a, b, and c satisfies a < b < c and a + c = 49. What is the area of the right triangle? mutute ## # 'S PS 面射机推翻林後然 而如此他教祥客 而此此他新林後席
 - a. 176. b. 210. c. 224. d. 225. e. 232.
 - Withite the the 'S PE 14. In $\triangle ABC$, AB = 20, BC = 7 and CA = 15. BC is extended to point D so that Istitute the ΔDAB is similar to ΔDCA . What is DC? (Figure is not drawn to scale)
 - a. 7.

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15. An isosceles right triangle is removed from each corner of a square piece of paper so matine # 3 that a rectangle remains. What is a length of a diagonal of the rectangle if the sum of the areas of the removed pieces is 200?

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- b. 20.
- «с. 40.
 - d. $10\sqrt{2}$. e. $14\sqrt{2}$.
- again وسي pulled 9 feet farth long is the ladder? 16. A ladder leans against a house with its base 15 feet from the house. When the ladder is pulled 9 feet farther away from the house, the upper end slides down 13 feet. How 面动机机教林送院 面动机机器带并接触 multilite # # 13 PR multure # # '\$

 - c. 24.
 - d. 25.
 - % е. 28.
- mistilute ### 17. A piece of construction paper 0.01 mm thick is cut in half, and one piece is placed on the other to make a pile. These are cut in half, and all four pieces are placed in a pile.

These four are cut in half and placed in a pile and the process continues. After the maritule ## # '\$ PE pieces have been cut and piled for the 10th time, what is the height of the pile in cm? matina # K'S Within the the 3 malilule ## # matilite ##

- a. .5 cm.
- b. .512 cm.
- c. 1 cm.

 $c. \frac{\pi}{4} \cdot s^2.$ d. s

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- d. 1.024 cm.
- e. 2.048 cm.

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Astitute the th 18. Let C_1 denote a circle that is circumscribed about a square of side s. Let C_2 denote

circle of radius s that is centered at a vertex of the square. The area of the region which is inside C_1 and outside C_2 is: mittute ## # '& R institute the the 'S PR Attitute the the "3 PR b. $\frac{\pi}{4} \cdot s^2 - \frac{\pi}{\sqrt{2}} \cdot s^2$ 加加加森林塔梯

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 - a. 500 thousand.

b. $\frac{\sqrt{2}}{4}$. c. 3.

e. $1 + \sqrt{3}$

d. $\frac{8}{3}$.

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- b. 5 million.
- c. 50 million.

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- d. 500 million.
- e. 5 billion. Invitute # # 'S PR

面动机机新林塔梯 Multille Mar H 'S R 面动曲曲新林资格 而以此他称林塔然 而此此版新林等除 24. A rectangular box with no top has a base that is a 2 ft by 3 ft rectangle and a a. $\sqrt{17}$. volume of 6 cubic ft. A fly crawls from one corner at the top of the box to the matitute ## # '& PS diagonally opposite corner at the top of the box. What is the minimum distance the

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- $... \sqrt{29}.$ d. $2 + \sqrt{13}.$ e. 7.

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25. Two ladders, one of which is three times as long as the other, rest on the floor and reach the same vertical height on the wall. The shorter ladder makes an angle of 60° with the floor. Whether the same vertical height on the wall. 60° with the floor. What angle does the longer ladder make with the floor? Round to the nearest degree.

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b. $\frac{1}{4}$ c. $\frac{3}{8}$.

a. 1/8.

26. Suppose that *ABCD* is a parallelogram, with the vertices listed in clockwise order, and that *E* is the midpoint of \overline{BC} and that *F* is the midpoint of \overline{CD} and that *F* is the midpoint of \overline{CD} . and that *E* is the midpoint of \overline{BC} and that *F* is the midpoint of \overline{CD} . What is the ratio of the area of ΔAEF to the area of the entire parallelogram?

- ·13 (%) e. The ratio cannot be determined uniquely from the given information.
- 面对机能称并接触 Asitute the H & K 加加加斯林诸熊 $y = \frac{1}{x^2}$. What is its area? a 2^{3} 27. A square has its base on the x-axis, and one vertex on each branch of the curve

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28. Suppose that there are some blabs, some blibs, and some blubs. Suppose also that all matitute ## # wite with blabs are blibs and some blubs are blabs. Which of the statements X, Y, Z MUST be true?

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- X: All blabs are blubs.
- Y: Some blabs are not blubs. multille # # 3 PR

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- Z: Some blibs are blubs. mistille the the
- Multille # # # B tute a. X only.

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- b. Y only.
- c. Z only.

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- 👞 d. X and Y only.
 - e. Y and Z only. finistitute 3

Autitute ## # 18 multilite # # 'S PC Withit the the the the matinte # # '3 29. Let T be an equilateral triangle of height h. Let S be a square of side s.

If *T* and *S* have the same area, then find $\frac{h}{d}$. m. K. K. K. K. Intritute # # # B 而此此他教林後発 而此此他就林塔然 Ro a. √2.1 5 × ** b. $\sqrt{3}$. c. $\sqrt[4]{3}$. $\frac{1}{7} \cdot \sqrt[4]{3} \cdot \frac{\sqrt{3}}{7} \cdot \frac{\sqrt{3}}{7$ e. $\frac{\sqrt{6}}{\sqrt{6}}$ with $\frac{\sqrt{6}}{\sqrt{6}}$ 而前前他教林塔然 面射曲線新林塔梯 面前加速教祥等発 而如此他教祥等死 Y. multure ## # 18 物体资料 Ro 30. A square of perimeter 20 is inscribed in a square of perimeter 28 in such a way that all vertices of the smaller square lie on the sides of the larger one. What is the greatest distance between a vertex of the inner square and a vertex of the outer square? mutule # # 'E R mythte # # '& K Institute ## # 13 PR mutule ## # '& PE Lyitute # # 19 a. $\sqrt{58}$ No. b. $\sqrt{65}$. c. 8. d. $\frac{7\sqrt{5}}{2}$ mariture ## # 18 stitute # # 'S PE 柳林、浅彩 e. $5\sqrt{3}$ Ro 31. At Central High School 50 girls play intramural basketball and 40 girls play

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many seconds does it take a rider to vertical feet above the bottom? mutilite # # '& PL many seconds does it take a rider to travel from the bottom of the wheel to a point 10 institute ## mistilule the the

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- b. 6. c. 7.5.
- 🚜 d. 10.
 - mytille # # 3 PS
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- motilite # # 13 PR a. 12π . b. $\frac{25\pi}{2}$. d. $\frac{27\pi}{2}$. e. 14π .

a. $\frac{1}{2m+1}$.

 $\begin{array}{c} \text{d.} \frac{1}{4m}.\\ \text{e.} \frac{1}{8m^2} \text{ and } \text{ b.} \end{array}$

b. m. m. m. m.

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37. An object in the plane moves from one lattice point to another. At each step, the matinte ## object may move one unit to the right, one unit to the left, one unit up, or one unit down. If the object starts at the origin and takes a ten-step path, how many different

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