

Washington State Math Championship – 2009
Geometry – 5th

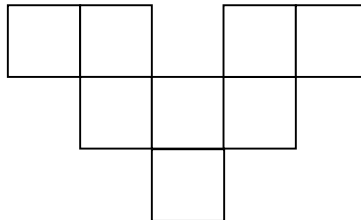
WASHINGTON STATE
MATH CHAMPIONSHIP



BLAINE SCHOOL DISTRICT

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1. If the area of a square is 40 square units and you double the dimensions of both the length and the width, what will the area of the new square be?
2. If you walk 50 yards south, then 40 yards east, and finally 20 yards north, how far are you from your starting point? Express your answer in yards.
3. In a given plane, if you are given two points that are two of the three vertices of an equilateral triangle, how many different points are possible for the third vertex?
4. Angles A , B , and C are the three angles that make up a scalene triangle. A is twice as big as C , and B is 20 degrees greater than A . What is the degree measure of angle C ?
5. A rectangular prism with a square base has a volume of 144 cubic centimeters. If the height is four centimeters, what is the length of the base in centimeters?
6. If the area of the figure below is 200 square units, what is the perimeter of the figure?



7. A digital (rectangular) picture often measures four inches by six inches. Suppose I wanted to create a frame for a digital picture that extends one inch from each side of the picture. What would the area, in square inches, of *only* the frame be?
8. If the length of each side of a scalene triangle is a prime number and the perimeter is also a prime number, what is the smallest possible perimeter of the triangle?

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9. Mr. Smiley, as shown below, is made up of two circular eyes, each with radius one centimeter, and a semicircular mouth with radius three centimeters inside a circular face with radius ten centimeters. To the nearest square centimeter, how much of Mr. Smiley's face is not taken up by his eyes or mouth?



10. A wheel of radius eight inches rolls smoothly down a hill, hitting a rock at the bottom after making 25 complete rotations. To the nearest inch, how many inches is the wheel from the spot where it began rolling to the rock?

Washington State Math Championship – 2009

Geometry – 6th

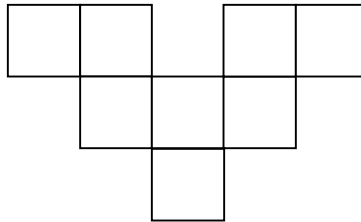
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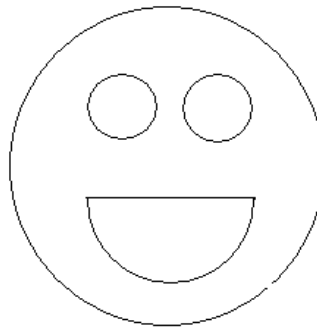
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Geometry – 6th

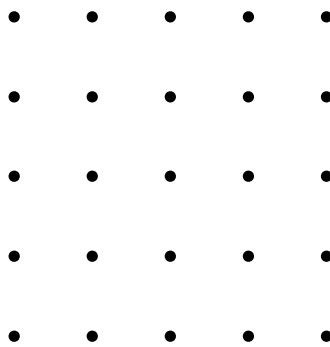
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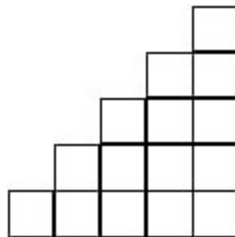
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8. How many uniquely sized squares can be drawn on the geoboard below such that all four vertices of a given square are points on the geoboard?



9. In the figure below, how many squares of any size are there?



10. If two vertices of a triangle are located at $(0, 0)$ and $(8, 0)$, what should the coordinates of the third vertex be if we want the area of the triangle to be 8 and the vertex to lie on the line $y = -x + 5$?

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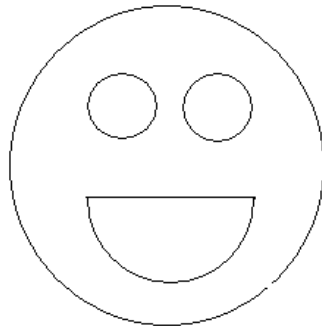
Geometry – 7th

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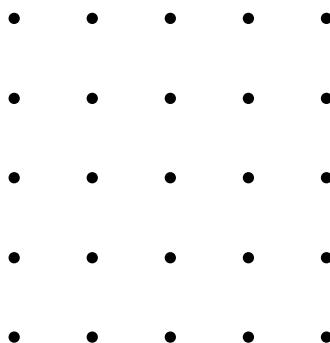


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Geometry – 7th

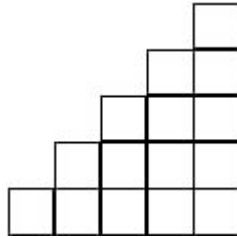
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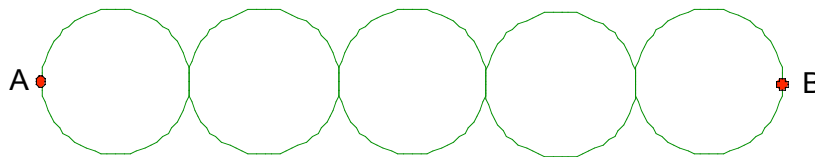
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8. A cylindrical pipe is being fit into a cylindrical hole in the ground such that there is exactly four inches of space between any part of the pipe and circumference of the hole. What is the minimum volume for the hole if the cylindrical pipe is 20 feet long with a radius of 3 inches? **Express your answer to the nearest cubic inch.**
9. If the total area of the five circles below is 20π , and you can only trace along the circular arcs, what is the minimum distance, in inches, that you would have to trace to travel from point A to point B ? **Express your answer in terms of π .**



10. If a plain 2-by-7-by-5 rectangular solid is dipped completely into a vat of neon pink paint, removed, and is then cut up into 1-by-1-by-1 cubes, how many of the cubes will have exactly one face covered with paint?

Washington State Math Championship – 2009
Geometry – 8th

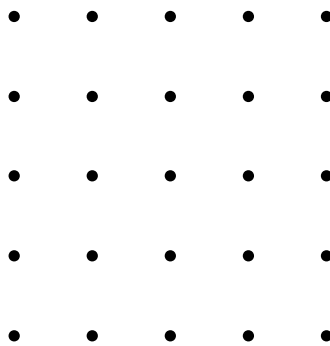
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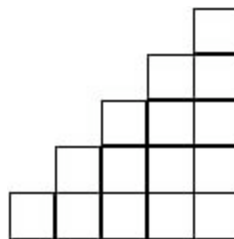
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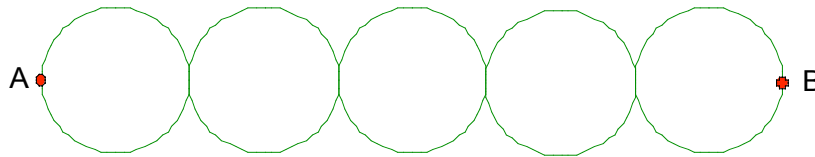
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8. At 8:09, what is the degree measure of the smaller angle formed by the minute and hour hands on an analog clock?
9. How many possible configurations of four one-inch by one-inch squares are there, if each square must have at least one side in common with another square? Note that two configurations are considered the same if a rotation of one configuration can result in the other configuration.
10. If the length of a rectangle is $y + 7$ and the area of the rectangle is $2y^2 + 15y + 7$, what would the perimeter be if each side was increased by two? **Express your answer in terms of y in simplest form.**