Twenty-Eighth Annual Mathematics Tournament
April 5, 2025
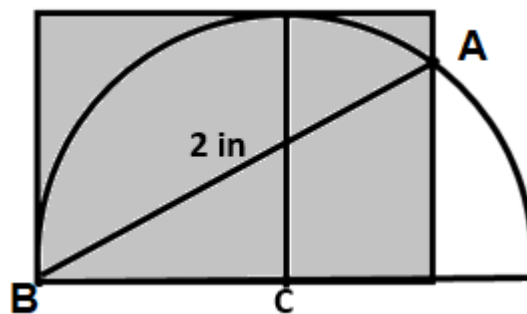## Afternoon Component Round #1

A survey of 300 tourists visiting Georgia found that the ratio of the number of tourists who visited Stone Mountain to those who visited Atlanta was 2 : 3. Among them, 90 visited both places and 60 visited neither Stone Mountain nor Atlanta. Based on this information, find the number of tourists who visited only Atlanta.

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Afternoon Component Round #2

Determine the area of the shaded rectangle, where C is the center of the circle and length of the chord $\overline{AB}$ is 2 inches.
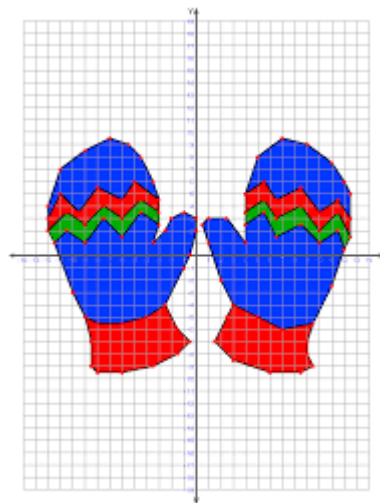
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Afternoon Component Round #3

How many ordered pairs of integers (a, b) satisfy all of the following inequalities?
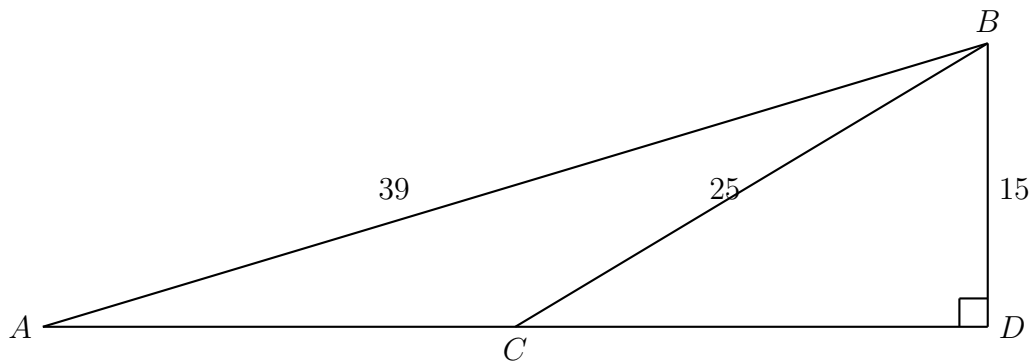
$$a^2 + b^2 < 16$$
$$a^2 + b^2 < 8a$$
$$a^2 + b^2 < 8b$$

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Afternoon Component Round #4

Find the area of the triangle ABC.

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Afternoon Component Round #5

A florist is buying 200 flowers, consisting of roses, tulips, and carnations for a festival. Roses are \$9 each, tulips are \$7 each, and carnations are \$1 each, and the total budget for flowers is \$1000.

Find the number of each type of flower so that the number of carnations is 60% of the total number of roses and tulips combined.
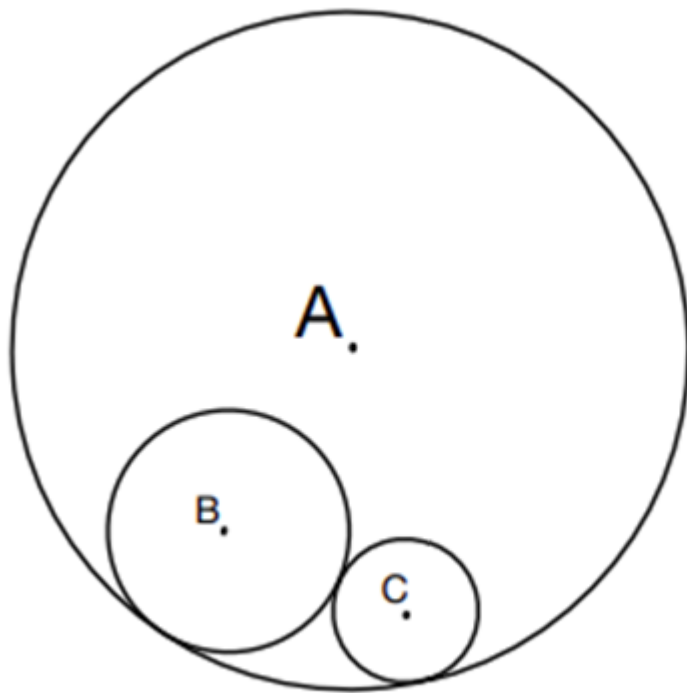
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Afternoon Component Round #6

We have three mutually tangent circles with centers at points A, B, and C. Assume that the circles are placed as in the picture below.

Assume that the radius of the circle with the center at A is 12. Calculate the perimeter of the triangle with the vertices at the points A, B, and C.

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Afternoon Component Round #7

A solid wood cube, measuring 25 centimeters on each of its edges, is painted blue on all six sides. The cube is then cut into smaller cubes, each measuring 1 cm by 1 cm by 1 cm.

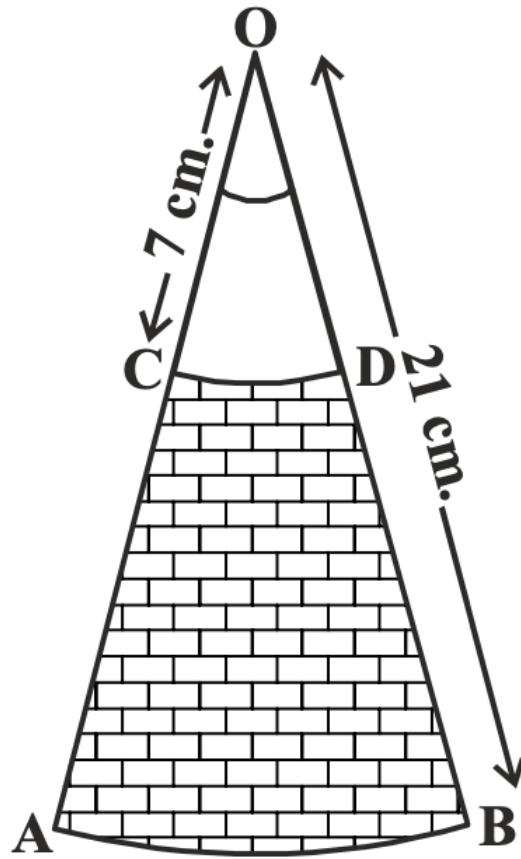How many of the smaller cubes have either one or two sides painted blue?

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Afternoon Component Round #8

AB and CD are arcs of two concentric circles of radii 21 cm and 7 cm, respectively, with center O (See figure). If $\angle AOB = 30°$, find the area of the shaded region (**Use** $\pi = 3.14$). Round your final answer to two decimal places.

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Afternoon Component Round #9

If $ab = 100, bc = 200, ac = 300$, find $a + b + c$.

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Afternoon Component Round #10

Find all integers x for which the value of the function $f(x) = 1 - \frac{8}{x+1}, x \neq -1$
is a prime number.