University of North Georgia

Mathematics Tournament

April 6, 2019

<u>Solutions for the Afternoon Team Competition</u>

<u>Round 1</u>

The area of the black region is found by taking the area of the square and subtracting the area of the semi-circles. The area of the black region is $2r^{\ 2} \quad 2\,\frac{r^2}{2} \quad 4r^2 \quad r^2 \quad 9 \quad 2.25$. Solving we get that $r^2 \quad \frac{9}{4}$ and $r \quad \frac{3}{2}$. Therefore the perimeter of the square is $2r\ \ 4 \quad 2\,\frac{3}{2}\ 4 \quad 12$.

<u>Round 2</u>

The area of each grid is $100\ ft^{\ 2}$.

$$\frac{1}{2}\ 400\ ft\ \ h \quad 200\ ft \quad 100\ ft \quad 0.5\ 13 \quad 100\ ft^{\ 2}$$

$$200\ ft\ \ h \quad 2\ 100\ ft^{\ 2} \quad 6.5\ 100\ ft^{\ 2}$$

$$200\ ft\ \ h \quad 4.5\ 100\ ft^{\ 2} \quad \frac{9}{2}\ 100\ ft^{\ 2}$$

$$h \quad \frac{9}{4}\ 100\ ft \quad 225\ ft$$

$$\sqrt{400^{\ 2} \quad 225^{\ 2}} \quad \sqrt{2 \qquad ^{2}}$$ ls ¬ -

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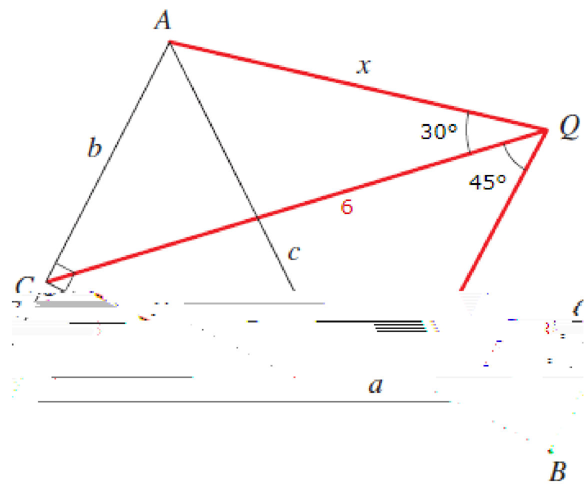
Round 9

Using the law of cosines we have: $a^2 \quad 36 \quad 64 \quad 48\sqrt{2}$, $b^2 \quad x^2 \quad 36 \quad 6x\sqrt{3}$, and $c^2 \quad x^2 \quad 64 \quad 16x\cos \; 30 \quad 45$, where $\cos \; 30 \quad 45 \qquad \sqrt{6} \quad \sqrt{2} \;\; /\, 4$. Using the Pythagorean Theorem we have:

$c^2 \quad a^2 \quad b^2$



$$\frac{\sqrt{} \quad \sqrt{}}{} \qquad\qquad \sqrt{}$$