MASSACHUSETTS MATHEMATICS LEAGUE CONTEST 6 – MARCH 2010 ROUND 3 TRIGONOMETRY: ANYTHING

ANSWERS

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***** NO CALCULATORS IN THIS ROUND *****

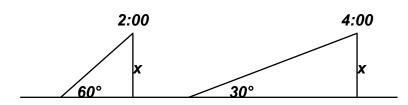
A) Solve for θ , $0^{\circ} \le \theta < 360^{\circ}$.

$$\sin\theta\cos\theta\tan(90^\circ - \theta)\cot(90^\circ + \theta)\sec(270^\circ + \theta)\csc(270^\circ - \theta) = \cot(180^\circ - \theta)$$

B) Robert Wadlow, the world's tallest man, stands *x* feet tall. Your task is to compute *x* given the following information:

At 4:00 PM, Robert's shadow is 10 feet longer than his shadow at 2:00 PM. At 4:00 PM the sun makes a 30° with the ground, but it made a 60° at 2:00 PM.

Recall: An exact answer is required. The given information is summarized in the diagram.



C) Given: $\begin{cases} \sin A = \frac{k}{\sqrt{41}} \\ \cos A = \frac{k+1}{\sqrt{41}} \end{cases}$ and k > 0. Compute $\sec \left(A - \frac{5\pi}{2} \right) \cdot \cos \left(A - 5\pi \right)$.