

**MASSACHUSETTS MATHEMATICS LEAGUE
CONTEST 1 - OCTOBER 2010
ROUND 6 ALG 1: EVALUATIONS**

ANSWERS

A) _____₃

B) _____

C) _____

******* NO CALCULATORS ON THIS ROUND *******

A) My lucky number expressed in base 2 is 1101.
Determine the base 3 representation of my lucky number.

B) Given: $a * b = a^b$, $a \circ b = (a + b)^2$ and $a \$ b = \sqrt{ab}$
Compute: $((2 * 3) \circ 4) \$ ((4 \circ 3) * 2)$

C) An ad campaign consists of pictures embedded in a rectangle which is subdivided into 4 smaller rectangles with integer dimensions by a pair of perpendicular lines passing through its interior. Each of the 4 smaller rectangles represents a season. In the diagram at the right, the smaller rectangles are not necessarily drawn to scale.

Spring	Fall
Summer	Winter

An ad for Denver, CO might feature skiing in the winter rectangle and make it the largest. An ad for Washington DC might feature cherry blossoms in springtime and make the spring the largest rectangle and so on.

Suppose the areas of the four smaller rectangles are 4, 6, 8 and x in some order. There are exactly two possible values of x .

Arranging the areas of the subregions as indicated in the diagram at the right, x would equal 3. Determine the other possible value of x .

		<u>4</u>	
<u>1</u>	x	4	
	6	8	
			<u>2</u>

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