

## Instructions:

- Team Code*

No.	1	2	3	4	5	6	Total
Score							
Sign by Jury							
Score							
Sign by Jury							

# *International Young Mathematicians' Convention (IYMC) 2012 Team Contest –Junior level*



*Team Name* \_\_\_\_\_ *Score* \_\_\_\_\_

1. A simple tune consists of the following 12 notes in the order:

C, E, E, E, G, G, D, F, F, A, B, B



How many different tunes can be made with the same 12 notes?

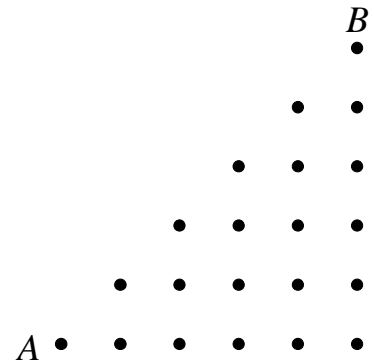
*ANSWER:* \_\_\_\_\_  
tunes

# International Young Mathematicians' Convention (IYMC) 2012 Team Contest –Junior level



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2. Any two adjacent dots in the diagram are 1 unit from each other. A path consists of horizontal and vertical segments between the dots joined end to end. How many paths from point A to point B are there with length 10 units?



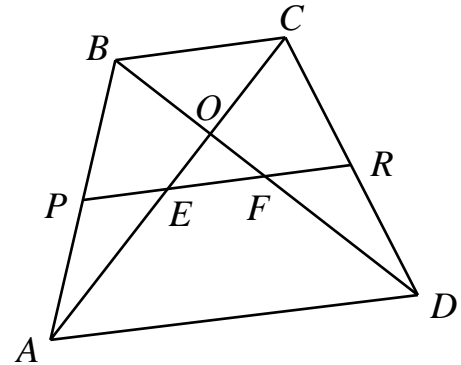
ANSWER: \_\_\_\_\_ paths

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3. In the figure,  $ABCD$  is a quadrilateral. If  $AP=BP$ ,  $CR=DR$  and  $\angle OEF = \angle OFE$ , prove that  $AC=BD$ .



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4. How many different ordered triples  $(a, b, c)$  of positive integers satisfy

$$\left(\frac{a}{c} + \frac{a}{b} + 1\right) \div \left(\frac{b}{a} + \frac{b}{c} + 1\right) = 11 \quad \text{and} \quad a + 2b + c \leq 50?$$

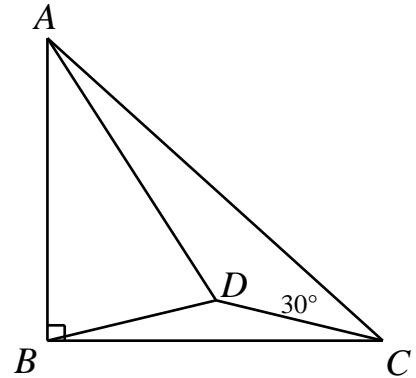
**ANSWER:** \_\_\_\_\_

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5. In the figure,  $AB=BC$  and  $\angle B = 90^\circ$ . If  $D$  is a point inside  $\triangle ABC$  such that  $BD=CD$  and  $\angle ACD = 30^\circ$ . What is the measure of  $\angle ADB$ , in degree?



○

ANSWER: \_\_\_\_\_

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6. If 
$$\begin{cases} a + b + c = 7 \\ a^2 + b^2 + c^2 = 21 \\ a^3 + b^3 + c^3 = 73 \end{cases}$$
, what is the value of  $a^4 + b^4 + c^4$ ?

***ANSWER:*** \_\_\_\_\_