Construct the Triangle Given the midpoints of a triangle, How do you construct the triangle?

★ Please **Submit** your solution to

- ✓ *Dr. Erol Akbas* @ matexa@langate.gsu.edu **or**
- ✓ *Dr. Yuanhui Xiao* @ matyxx@langate.gsu.edu

before the **deadline**: **Friday, March 25, 2011, 5:00PM**.

★ You may get a hard copy of this problem in the box for **Problem of the Month** in the 7^{th} floor of COE (College of Education).

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Problem of Last Month: Find the sum

Place a rectangle into xy-plane. Let m_1, m_2, m_3, m_4 be the slopes of consecutive sides. Assume that $m_1 + m_2 = -3/2$. Find the sum $\sum_{i=1}^{4}\sum_{j=1}^{4} m_i \cdot m_j$.

Winner: Jeremy Brown.

Solution. It is easy to see that $m_1 = m_3$ and $m_2 = m_4$. So

$$\sum_{i=1}^{4}\sum_{j=1}^{4} m_i m_j = 4\sum_{i=1}^{2}\sum_{j=1}^{2} m_i m_j = 4(m_1^2 + m_2^2 + 2m_1 m_2) = 4(m_1 + m_2)^2.$$

Now using the given condition $m_1 + m_2 = -3/2$ we shall get

$$\sum_{i=1}^{4}\sum_{j=1}^{4} m_i m_j = 4(-3/2)^2 = 9.$$

This solution is provided by Dr. Erol Akbas.

Please note, there are many ways to solve this question since the given information is very rich. For example, if we know the fact that the neighboring sides are perpendicular, hence $m_1 \times m_2 = -1$, we can find a different approach.