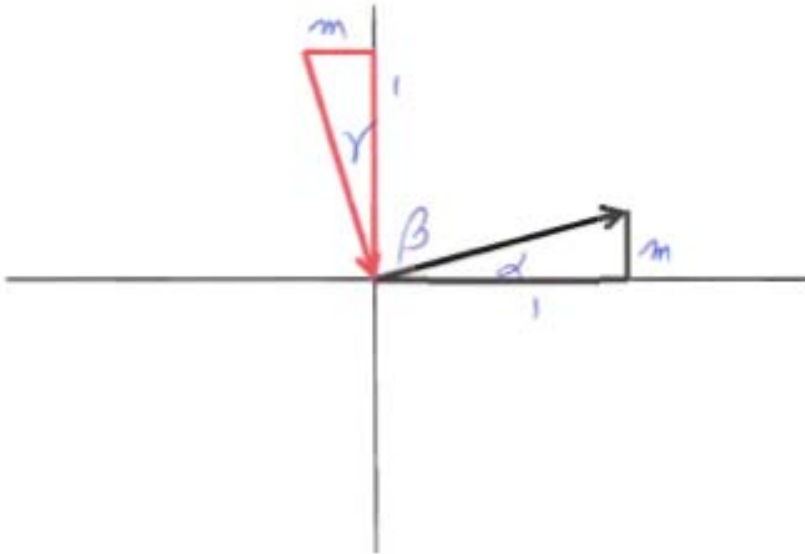


Theorem: If the product of the slopes of two lines = -1, the lines are perpendicular.

Let one line have slope m_1 and the other have slope m_2 . We will prove that $m_1 m_2 = -1$.

Let us draw the first line through the origin of a coordinate system. Show this by drawing a right triangle with length 1 and height m . The slope is m .



We draw another triangle shown in red, height 1 and length $-m$. The slope is $-1/m$.

We see that $\alpha + \beta = 90^\circ$.

The two triangles are congruent, as they are right triangles with two adjacent sides equal. Therefore $\gamma = \alpha$, and so $\gamma + \beta = 90^\circ$.

This proves that the lines are perpendicular.

Dr. S. Aranoff, 6/21/2011