

Let s = side of the square,

t = side of the triangle.

Then

$$4s + 3t = 13$$

$$A = s^2 + (1/4)t^2\sqrt{3}$$

$$t = (13 - 4s)/3$$

$$A = s^2 + (1/4)((13 - 4s)/3)^2\sqrt{3}$$

$$A = s^2 + ((169 - 104s + 16s^2)/36)\sqrt{3}$$

$$A = s^2 + 0.7698s^2 - 5.0037s + 8.1310$$

$$A = 1.7698s^2 - 5.0037s + 8.1310$$

$$dA/ds = 3.5396s - 5.0037 = 0 \text{ for minimum}$$

$$s = 1.41 \text{ m}$$

$$4s = 5.65 \text{ m}$$

For maximum total area the square would use all the wire, 13m