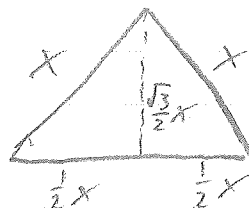


Math 542 3/27 HW

OK+

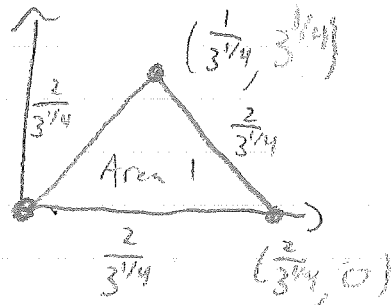
24 Prove or disprove: Using a straight edge and compass it is possible to construct an isosceles triangle with area 1.

I will show you can construct an equilateral triangle of area 1.
Find side length:



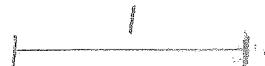
$$\begin{aligned} \text{Area} &= \frac{1}{2}x \cdot \frac{\sqrt{3}}{2}x = 1 \\ x^2 &= \frac{4}{\sqrt{3}} \\ x &= \frac{2}{\sqrt[3]{3}} \end{aligned}$$

You can construct the points $(0,0)$, $(\frac{2}{\sqrt[3]{3}}, 0)$, and $(\frac{1}{\sqrt[3]{3}}, \frac{2}{\sqrt[3]{3}})$, since they are square roots of rationals, so you can construct an equilateral (thus isosceles) triangle of area 1:

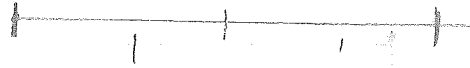


I have constructed this triangle on the back.

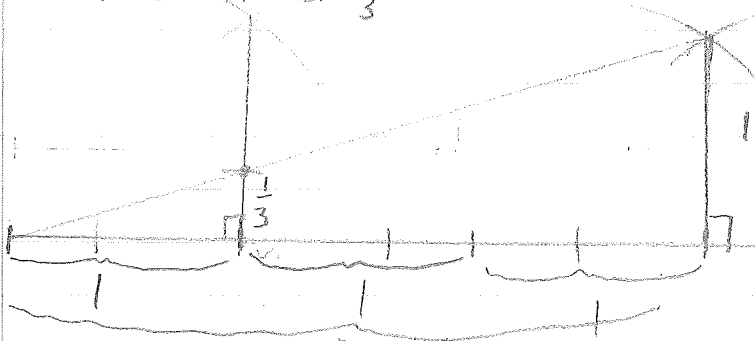
1. Define length 1



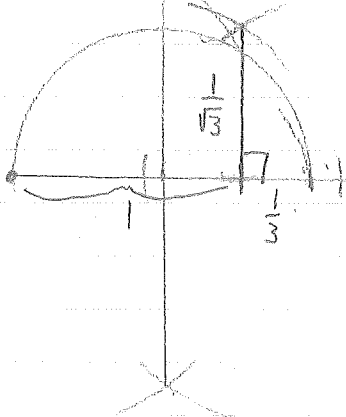
2: Construct $\frac{2}{3}$



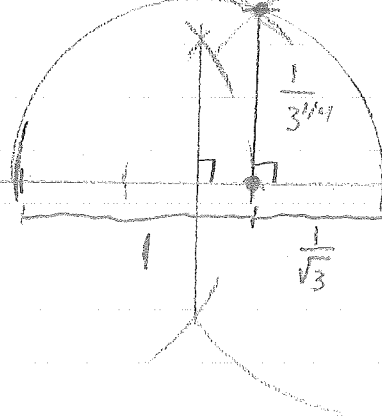
3: Construct $\frac{1}{3}$



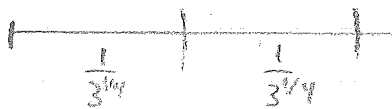
4: Construct $\sqrt{\frac{1}{3}}$



5: Construct $\sqrt{\frac{1}{3}}$



6 construct $\frac{2}{3^{1/4}}$



7: Construct an equilateral triangle of side length $\frac{2}{3^{1/4}}$

