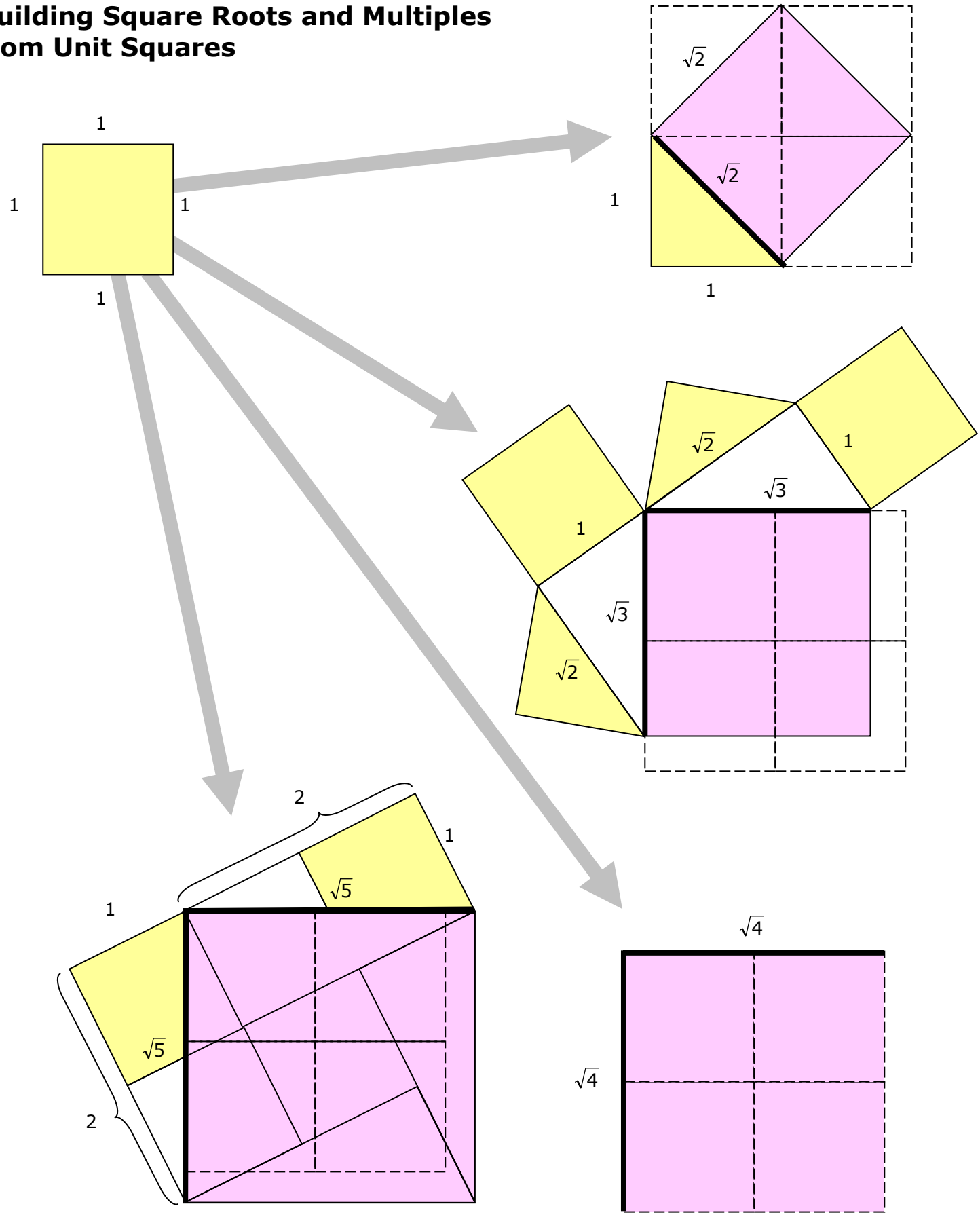
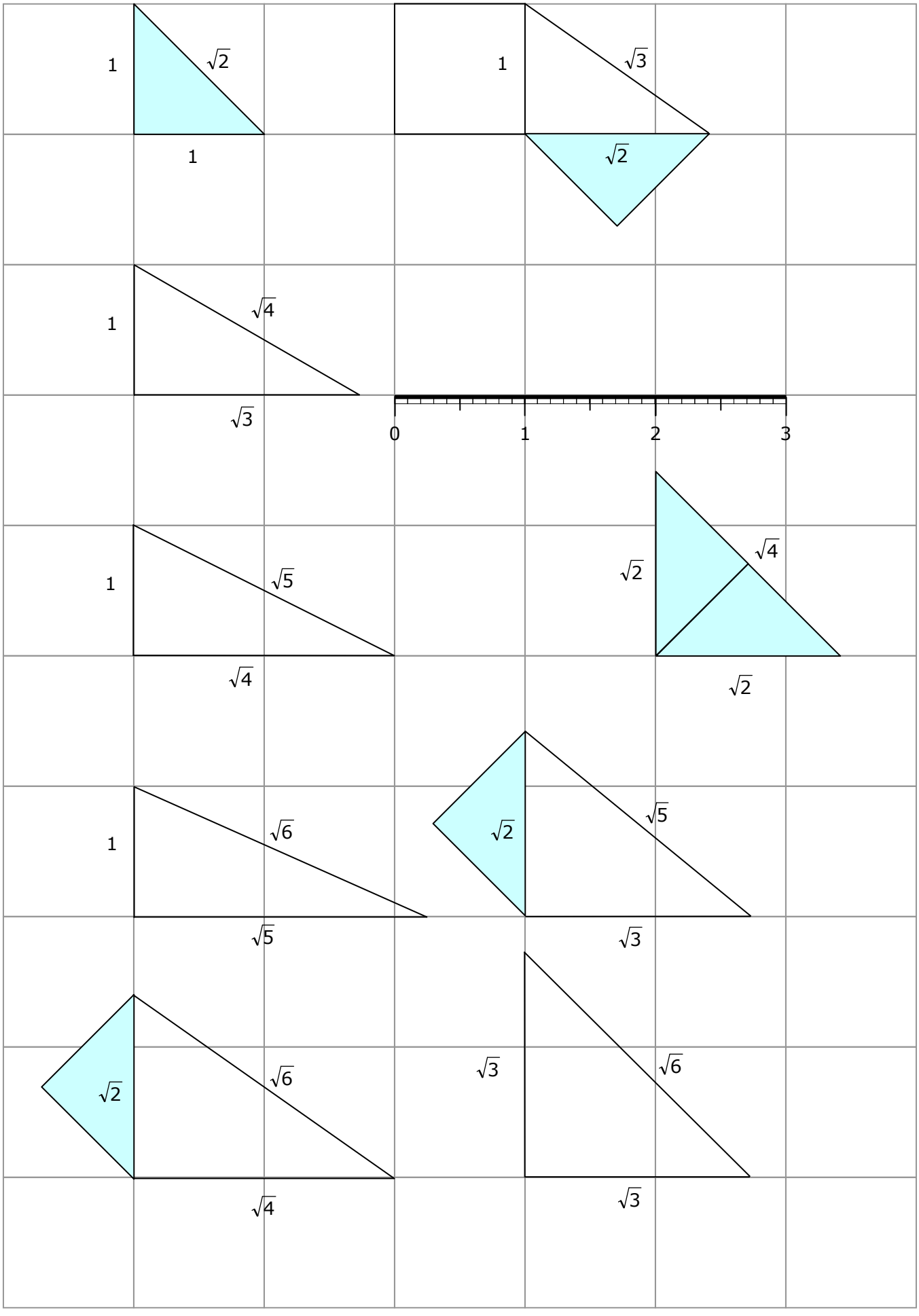
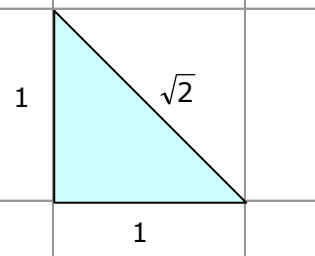
Building Square Roots and Multiples from Unit Squares

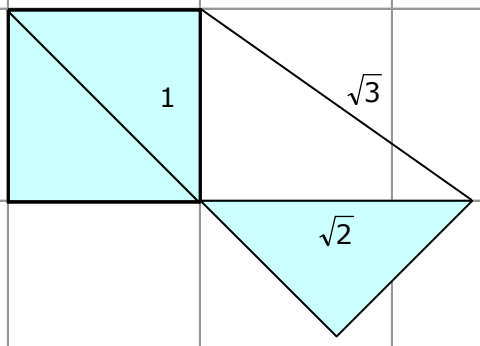


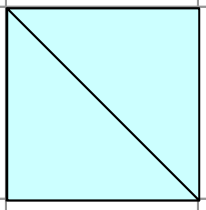

1
√2
1
1
√3
√2
1
√4
√3
0
1
2
3
1
√5
√4
√2
√4
√2
1
√6
√5
√2
√5
√3
√2
√6
√4
√3
√6
√3

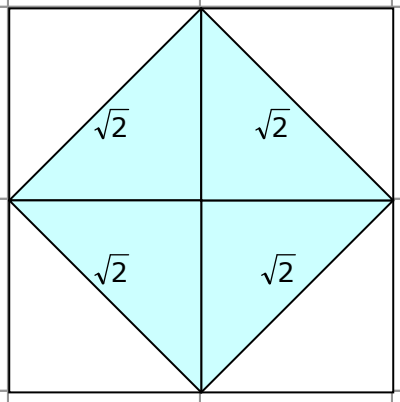
Build these on your own…						
$\sqrt{1}$						
$\sqrt{2}$						
$\sqrt{3}$						
$\sqrt{4}$						
$\sqrt{5}$						
$\sqrt{6}$						

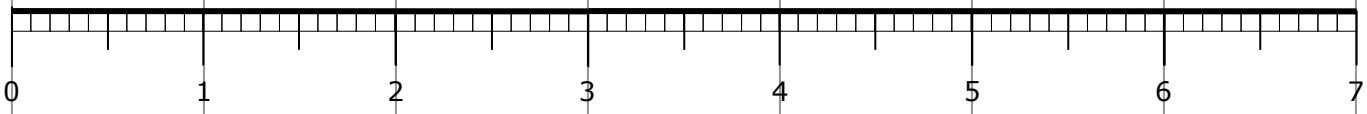
Special Triangles

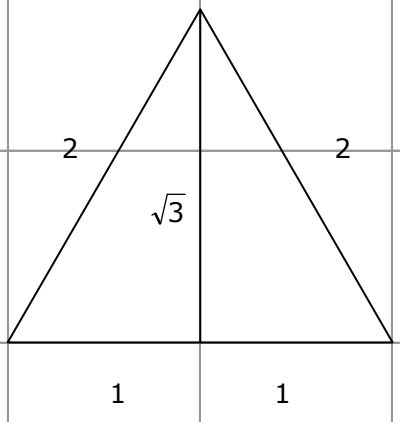


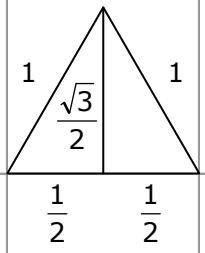


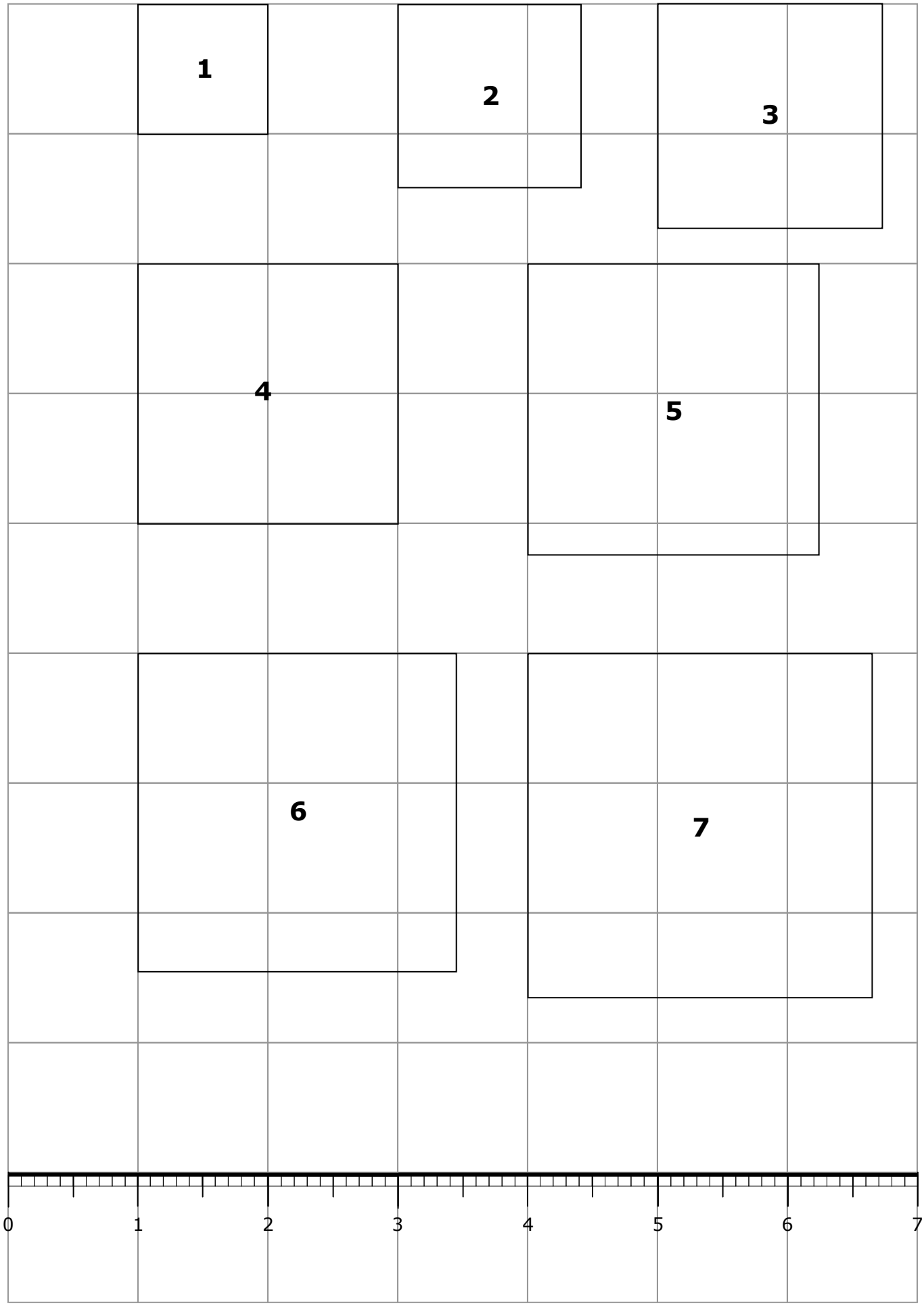






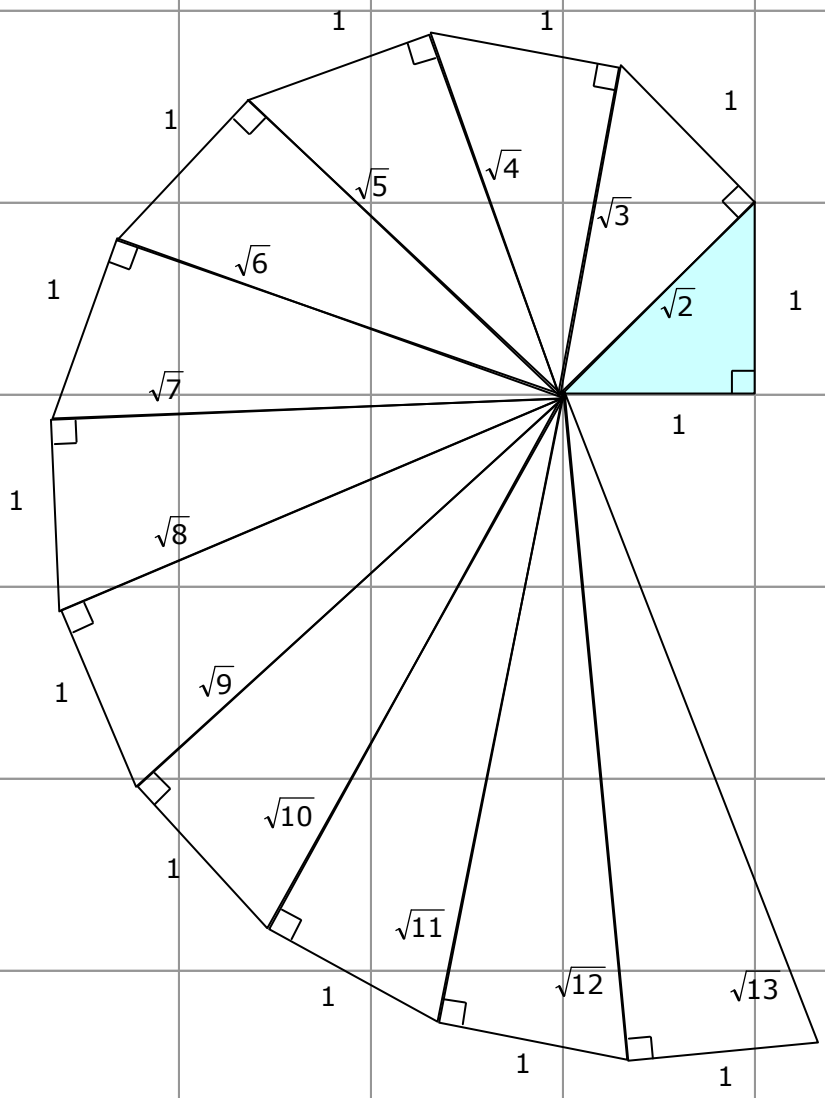





1
2
3
4
5
6
7
0
1
2
3
4
5
6
7

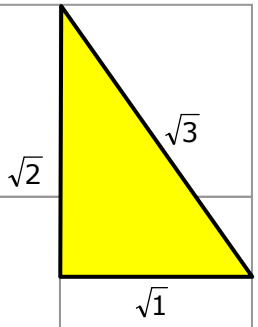
Root Spiral (Wheel of Theodorus)

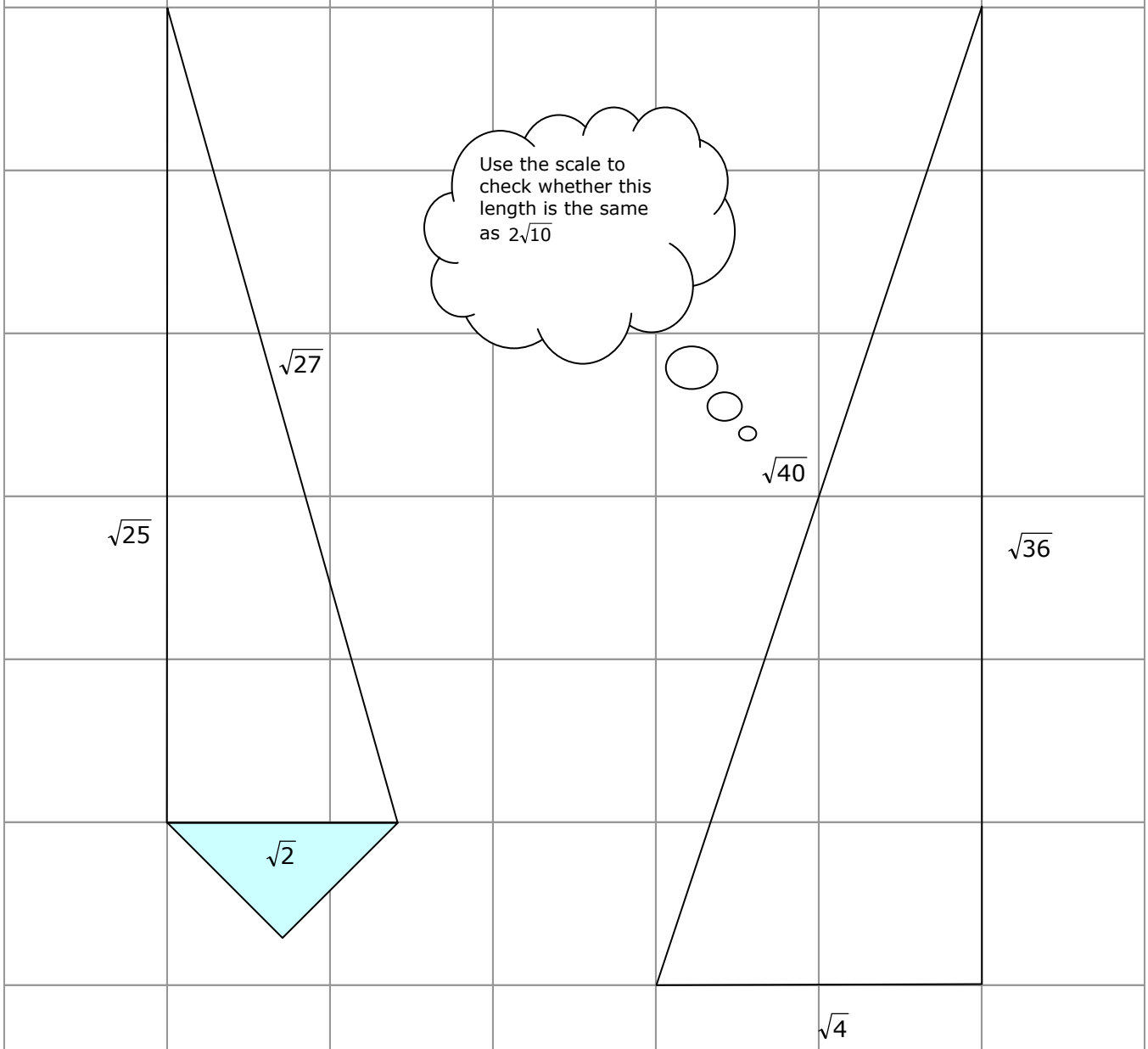
There is a terrific website dedicated to spirals at www.mathematische-basteleien.de/spiral.htm, a nice construction at http://jwilson.coe.uga.edu/EMAT6680Fa06/Love/Investigation.htm, and a java applet at http://www.csua.berkeley.edu/~raytrace/java/spirals/square.html



Root Spirals—on and on…

This same method can be used to build any square root. $\sqrt{40}$, for example, can be built incrementally, starting with a unit square. But it's much faster to work with perfect squares. And, a nice consequence of the Pythagorean Theorem, $a^2 + b^2 = c^2$ is that $\sqrt{a^2 + b^2} = \sqrt{c^2}$, so right triangles with legs of, for example, $\sqrt{1}$ and $\sqrt{2}$ will have a hypotenuse of $\sqrt{3}$.





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