Chpt 3 All groups: 3.1 (part c on Maple). Individual: 3.3

Pyth trip.

$a^2 + b^2 = c^2$

Circle

$x^2 + y^2 = 1$

$$\left(\frac{a}{c}\right)^2 + \left(\frac{b}{c}\right)^2 = 1$$

$\frac{a}{c}, \frac{b}{c}$ are rational numbers

So Pyth. trips give rational points on the unit circle.

eg

$(3,4,5) \rightarrow \left(\frac{3}{5}\right)^2 + \left(\frac{4}{5}\right)^2 = 1$

$(5,12,13) \rightarrow \left(\frac{5}{13}\right)^2 + \left(\frac{12}{13}\right)^2 = 1$

$(8,15,17) \rightarrow \left(\frac{8}{17}\right)^2 + \left(\frac{15}{17}\right)^2 = 1.$

$(33,56,65) \rightarrow \left(\frac{33}{65}\right)^2 + \left(\frac{56}{65}\right)^2 = 1$

Does it seem reasonable that any rational point on the unit circle will give a Pythag. trip.?

Recall:

$\mathbb{N}$ = natural numbers 1, 2, 3...

$\mathbb{Z}$ = integers

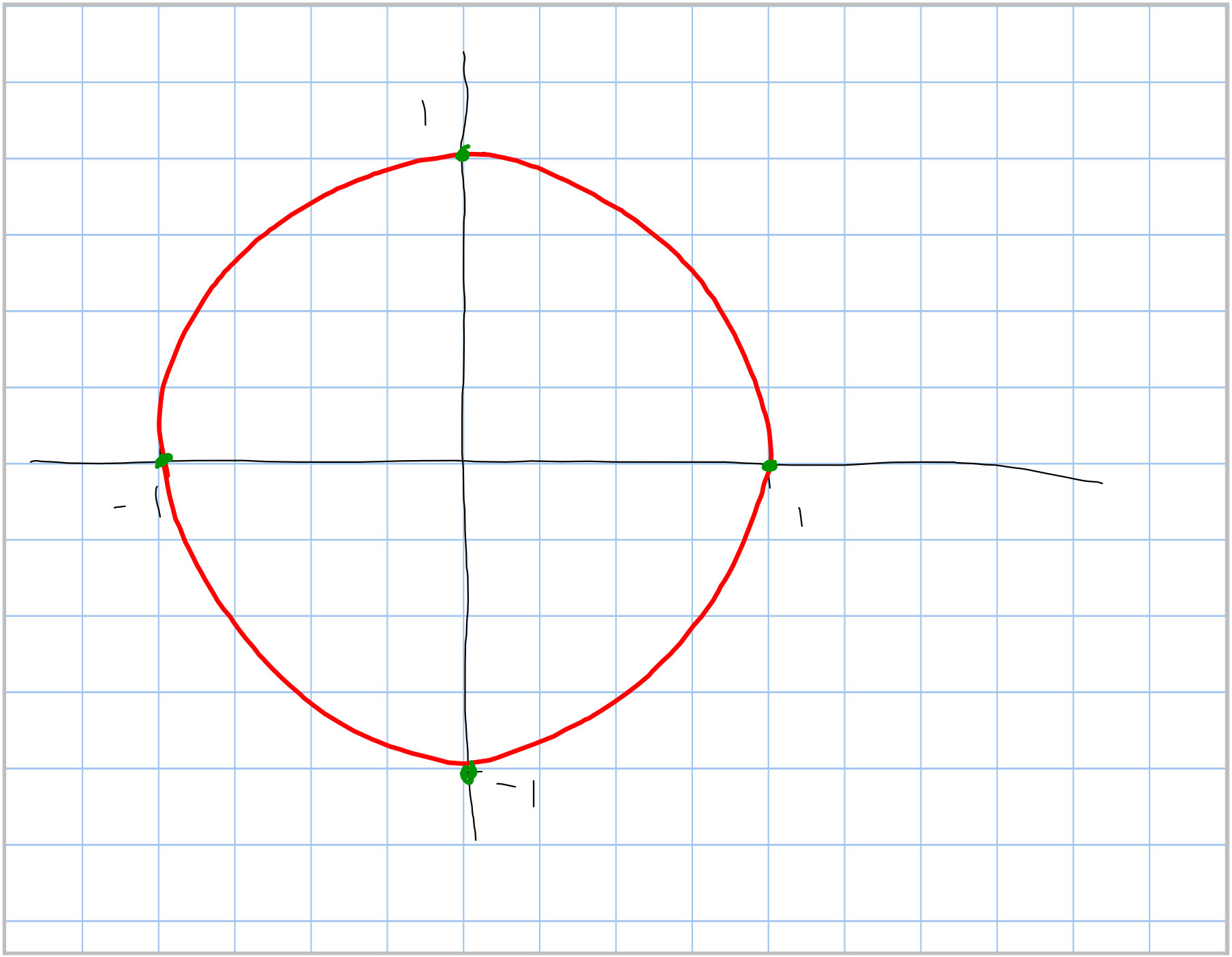
$\mathbb{Q}$ = rational numbers

$$\left\{ \frac{a}{b} \,\middle|\, a, b \in \mathbb{Z},\ b \neq 0 \right\}$$

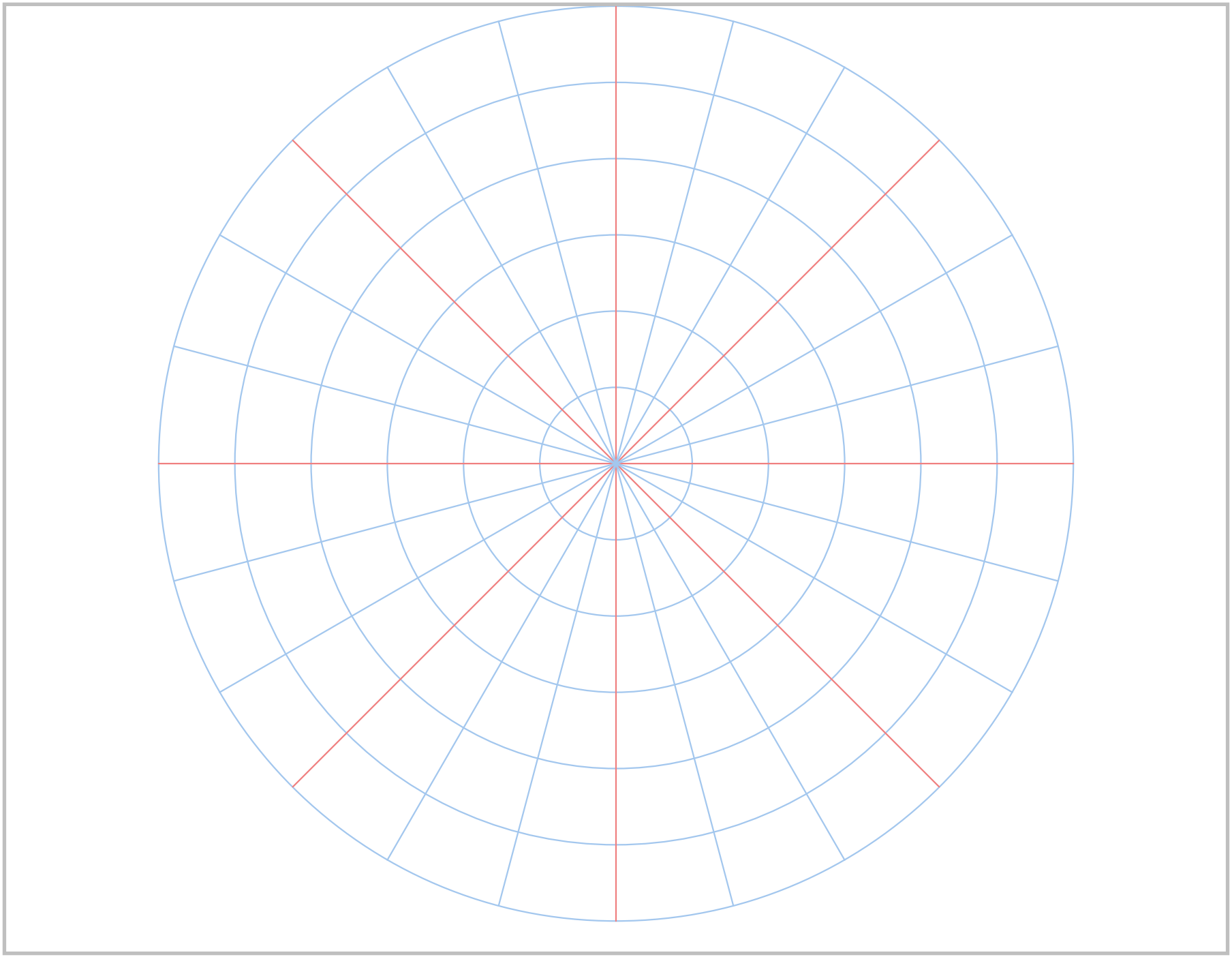
$\mathbb{R}$ = real numbers

$\mathbb{C}$ = complex numbers

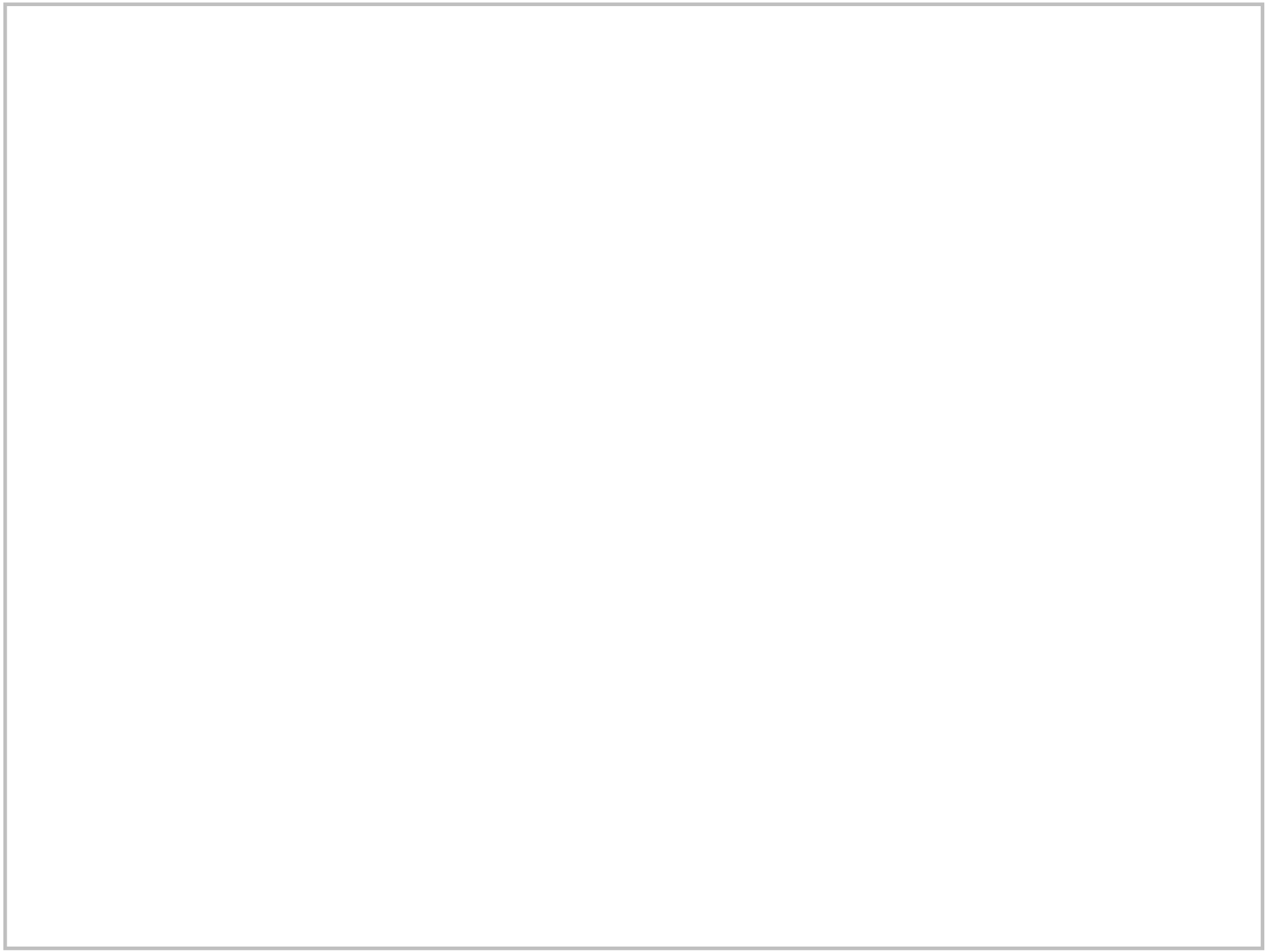
$\mathbb{H}$ = Hamiltonian quaternians



Title: Grid - large (5 of 7)



Title: Polar coordinates - large (6 of 7)



Title: Feb 6 - 9:45 AM (7 of 7)