2 Dimensions Hyperbolic Model

definitions & theorems from Origametry by Daniel Heath.

While working in a group make sure you:

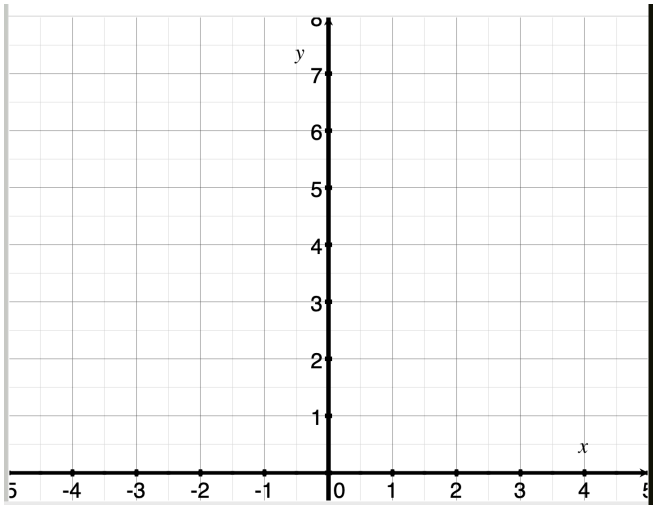
- Expect to make mistakes but be sure to reflect/learn from them!
- Are civil and are aware of your impact on others.
- Assume and engage with the strongest argument while assuming best intent.

In the half plane model:

- a *point* will be an ordered pair of real numbers (x, y) with $y > 0$.
- a *line* will be either
  1. a vertical semi-line (at h is $\{(h, y)|y \in \mathbb{R}^+\}$), or
  2. an open semi-circle (with parameters h and r, $\{(x, y)|(x-h)^2+y^2 = r^2, r, y > 0\}$)

1. Draw the vertical semi-line: $\{(4, e^t)|t \in \mathbb{R}\}$

2. Draw the open semi-circle $(-3 + 2\tanh(t), 2\text{sech}(t))$ as $t \in \mathbb{R}$.



Hyperbolic Trigonometric Definitions

$$\sinh(t) = \frac{e^t - e^{-t}}{2} \qquad \cosh(t) = \frac{e^t + e^{-t}}{2} \qquad \tanh(t) = \frac{\sinh(t)}{\cosh(t)}$$

$$\text{csch}(t) = \frac{1}{\sinh(t)} \qquad \text{sech}(t) = \frac{1}{\cosh(t)} \qquad \coth(t) = \frac{\cosh(t)}{\sinh(t)}$$

3. Compute $\cosh^2(t) - \sinh^2(t)$.

4. Find a hyperbolic parameterization for the semi-circle $(x+3)^2 + y^2 = 4$.