Week 6

1. Our trapezoids are all thin & long
   → consider when the shape is arbitrarily-shaped

2. For long & thin trapezoids,

   But a later case.

X Why are we looking for the largest circle in trapezoid?
We want to find the smallest circle but not the largest one.
Reminders:

1. Our goal is to prove that it's impossible to have all disks in pattern 1 have diameters < \( \frac{1}{3} \) of the figure.

2. Impossible to let disk 3 have diameter \( \leq \frac{1}{3} \) of the larger disk, as for long and thin trapezoids, the largest disk always at the bottom.

3. Simply by rotating ray 2 by dot 2, create a new disk 3 with dia \( \geq \frac{1}{3} \) of the figure.
A quick note

Ray 1 & Ray 2 can only rotate/move along the circumference of disk 1 & 2 to ensure that their diameters \( \leq \frac{1}{3} \text{ d} \).
Assume that

gives 5 disks with all \( > \frac{1}{3}s \),
then it's simply inferior than

\[ \text{pattern 1} \]

\[ \text{pattern 2} \]

\( \text{b/c pattern 2 simply guarantees a way to detect disks with radius } \frac{4}{5}s \),
but pattern 1 always finds disks with radius \( > \frac{1}{5} \left( \frac{2}{3}s + 3 \right) \).

\( \Rightarrow \) Once 1 of the 3 possible largest disks has
dia. radius \( > \frac{1}{5}d \), the pattern is inferior to the proposed best one (pattern 2).

Proof of that all 3 disks in pattern 2, totaling it creates larger disks

is larger than \( \frac{4}{5}d \).

(1) The first row

(2) If squishing it to the left

(3) To make the left circle \( \frac{1}{3}d \)

Then Consider all causes

(1) Fix disk 1. 1.
Not sure how to get the length of?

Put as ray 1 & 2 rotate, the disk's area and only get larger.

When \( \theta = 45^\circ \), \( d_2 \) obtains its max value. \( \Rightarrow \) \( d_2 \) can never be \( < \frac{1}{3} \).