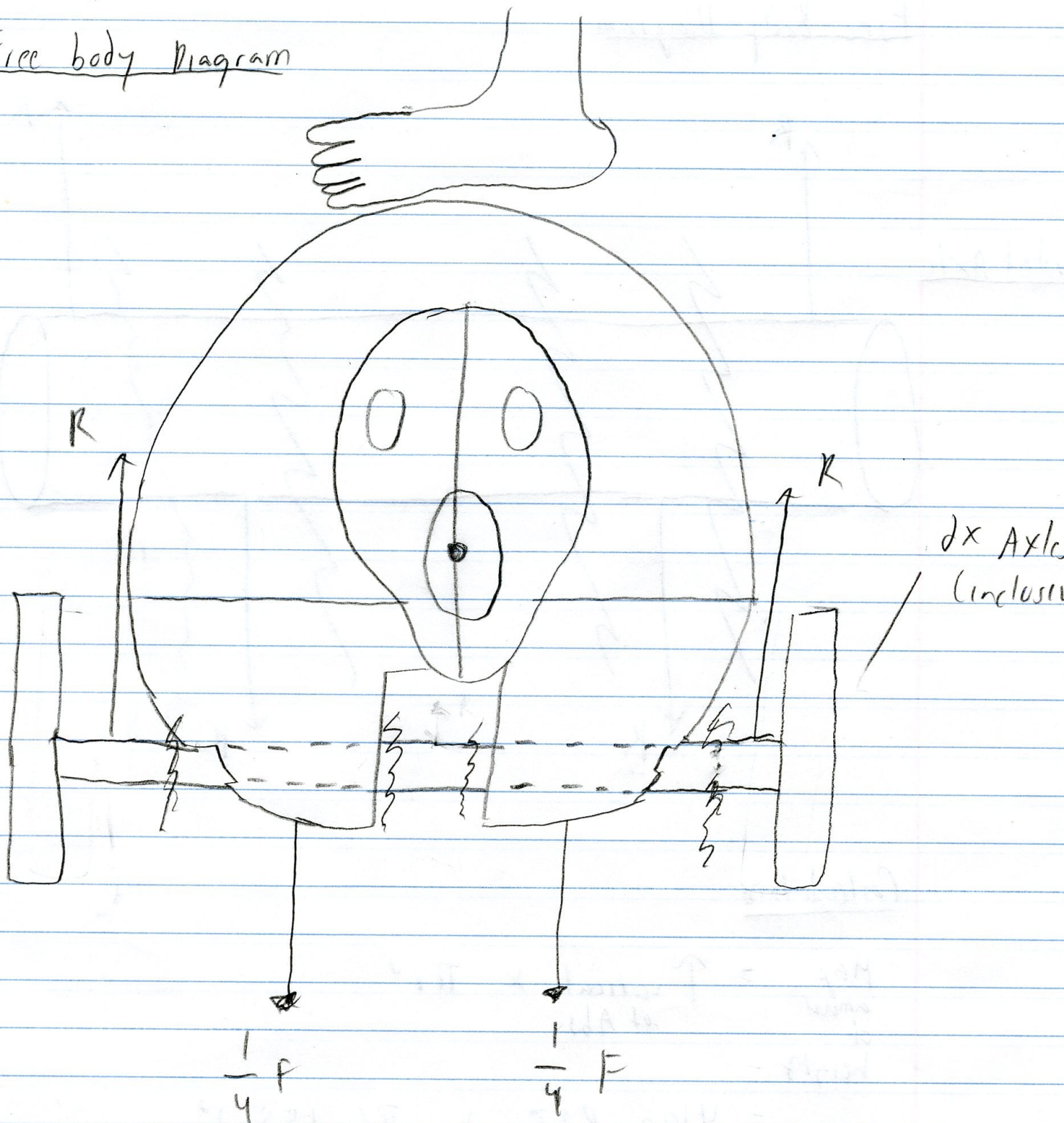


Brim Yang & Janill Lema

Free body diagram

Toy



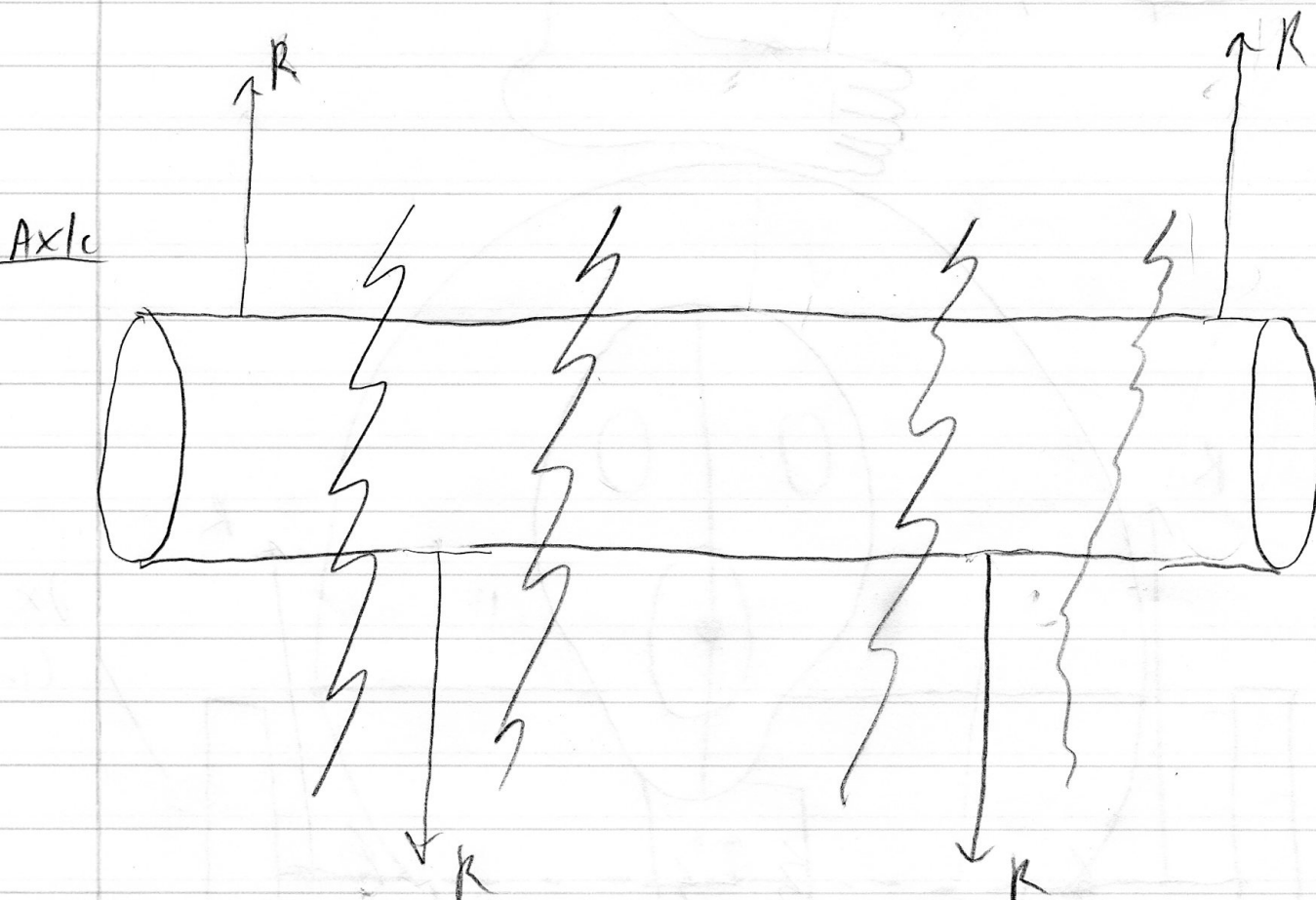
Assumption :

- Baby weighs 30 pounds

- Region of possible failure will occur at the axles

- Since the baby is stepping at the very center of the shell, the force will be distributed among the four places of the axles.

Free Body Diagram



Calculations

$$\begin{aligned} \text{Max} &= \uparrow_{\text{vertical}} \times \pi r^2 \\ \text{amount} & \quad \text{of Abs} \\ \text{of} & \\ \text{height} & - \end{aligned}$$

$$= 4100 \text{ PSI} \times \pi (0.15 \text{ in})^2$$

$$\begin{aligned} \text{Max} &= 289 \text{ lbs at one of the four sections} \\ \text{amount} & \quad \text{of height} \end{aligned}$$

- Since the weight is distributed, multiply by 4

Sections

$$4 \times (289) \text{ lbs} = 1156 \text{ lbs} \quad \text{Max amt of weight the toy can withstand}$$

$$\frac{1156 \text{ lbs}}{30 \text{ lb}} = 38.53 = n = \text{safety factor. It's greater than 2}$$