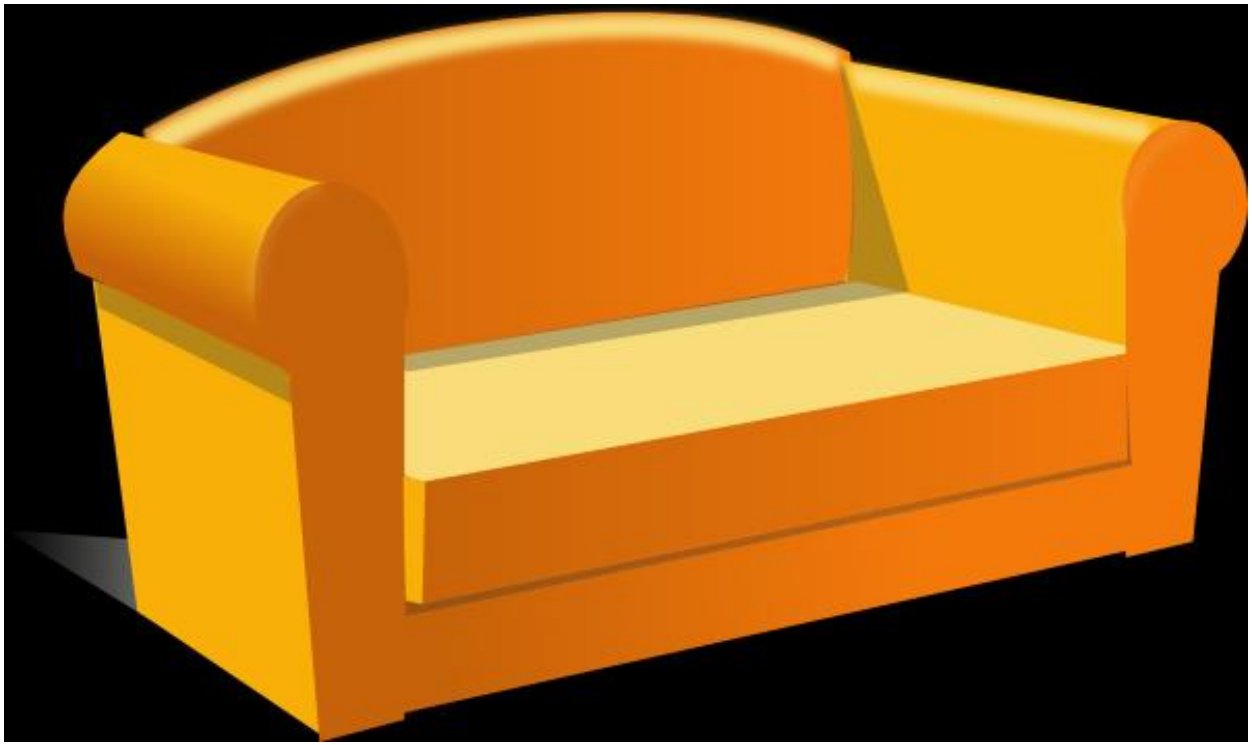
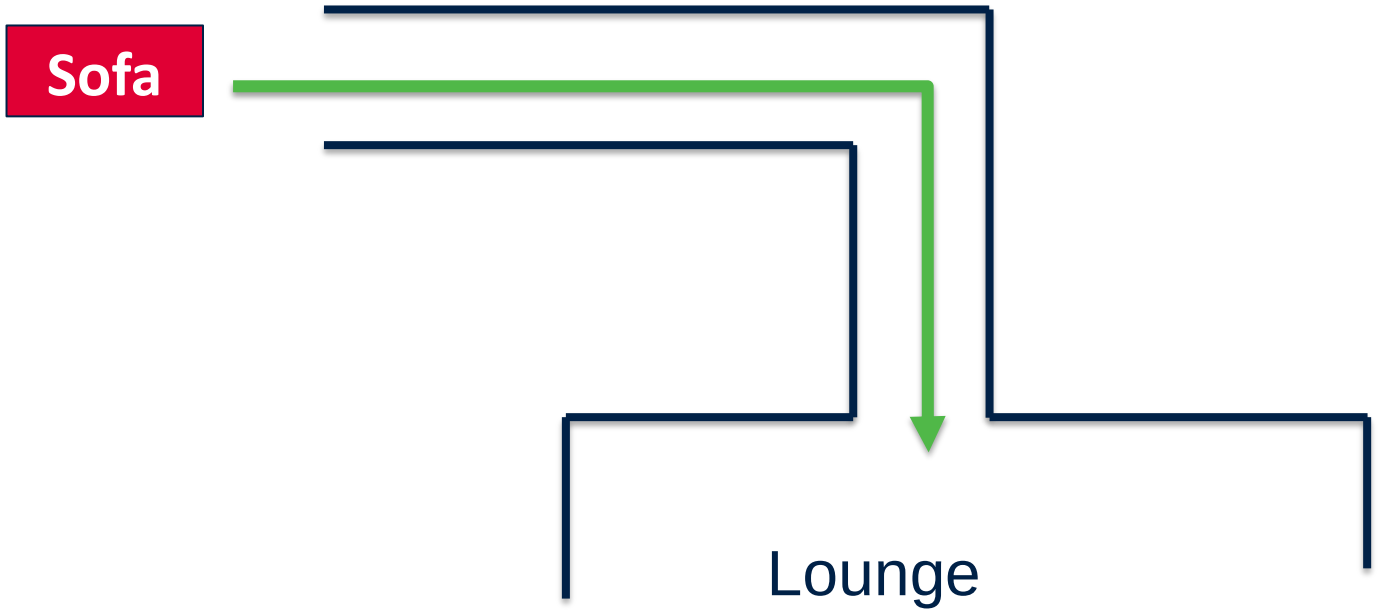
Advanced Mathematics Support Programme®

Moving Sofas

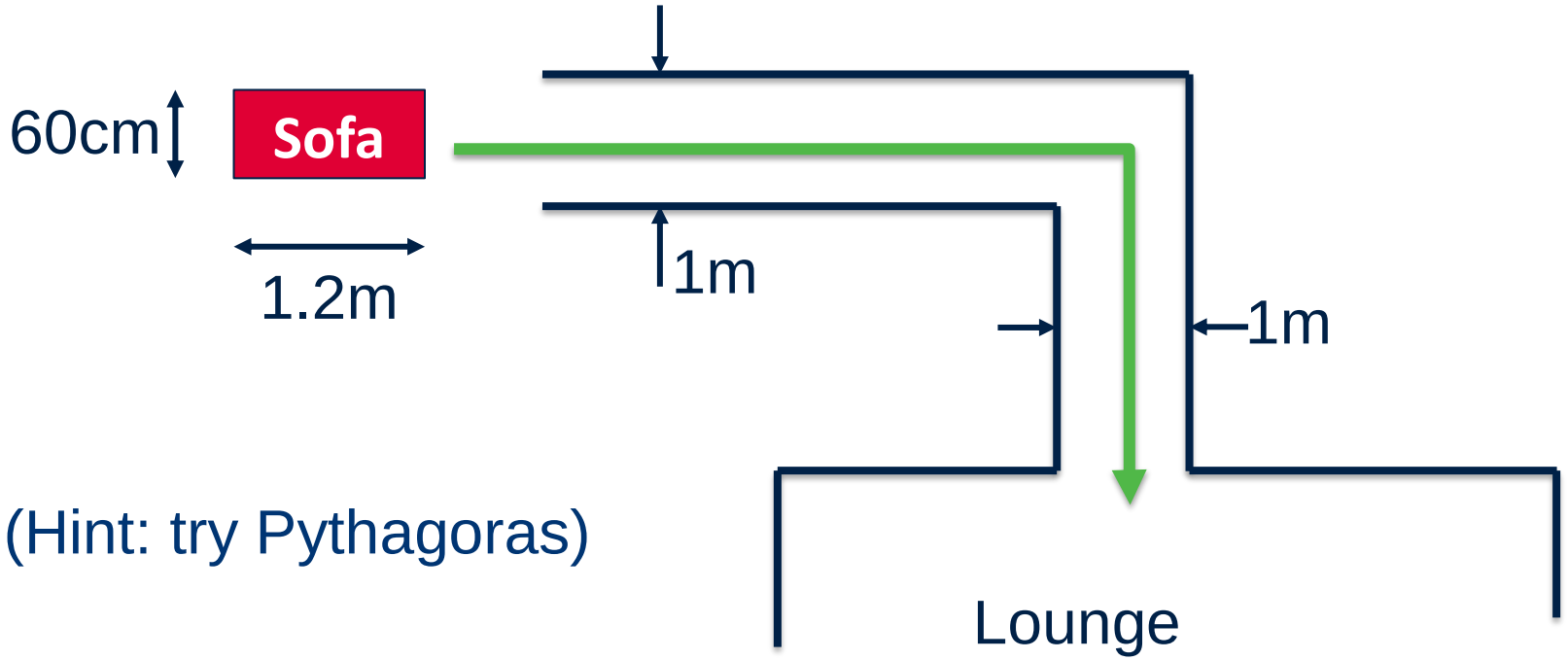


The new sofa arrives!

- Can the delivery team take it to the lounge for you along the corridor?



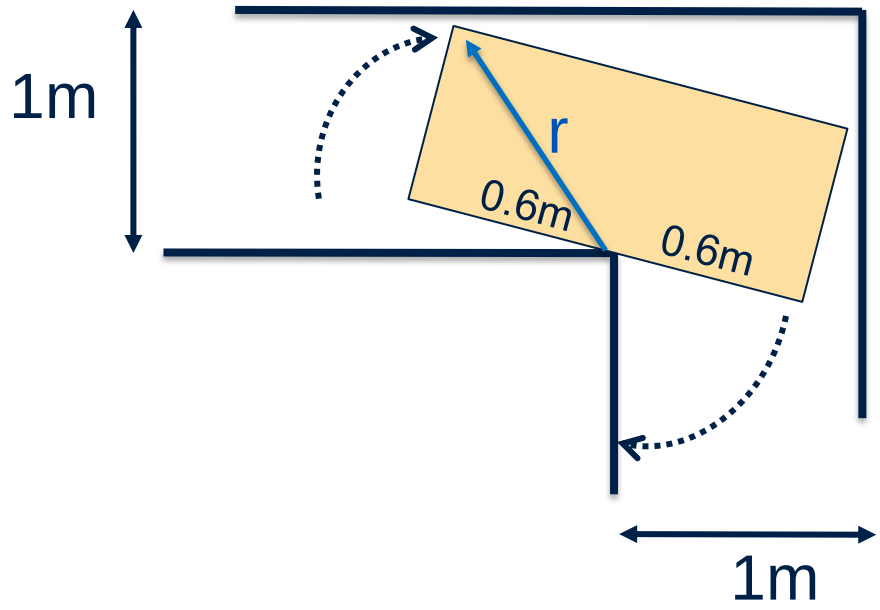
- The sofa is 1.2m long and 60cm wide. The corridor is exactly 1m wide and has a right-angled bend.
- Can the sofa be taken to the lounge? Unfortunately the team can only carry it horizontally!



(Hint: try Pythagoras)

Helpful hint!

- There are several different ways of solving this but you could consider this as a starting point:



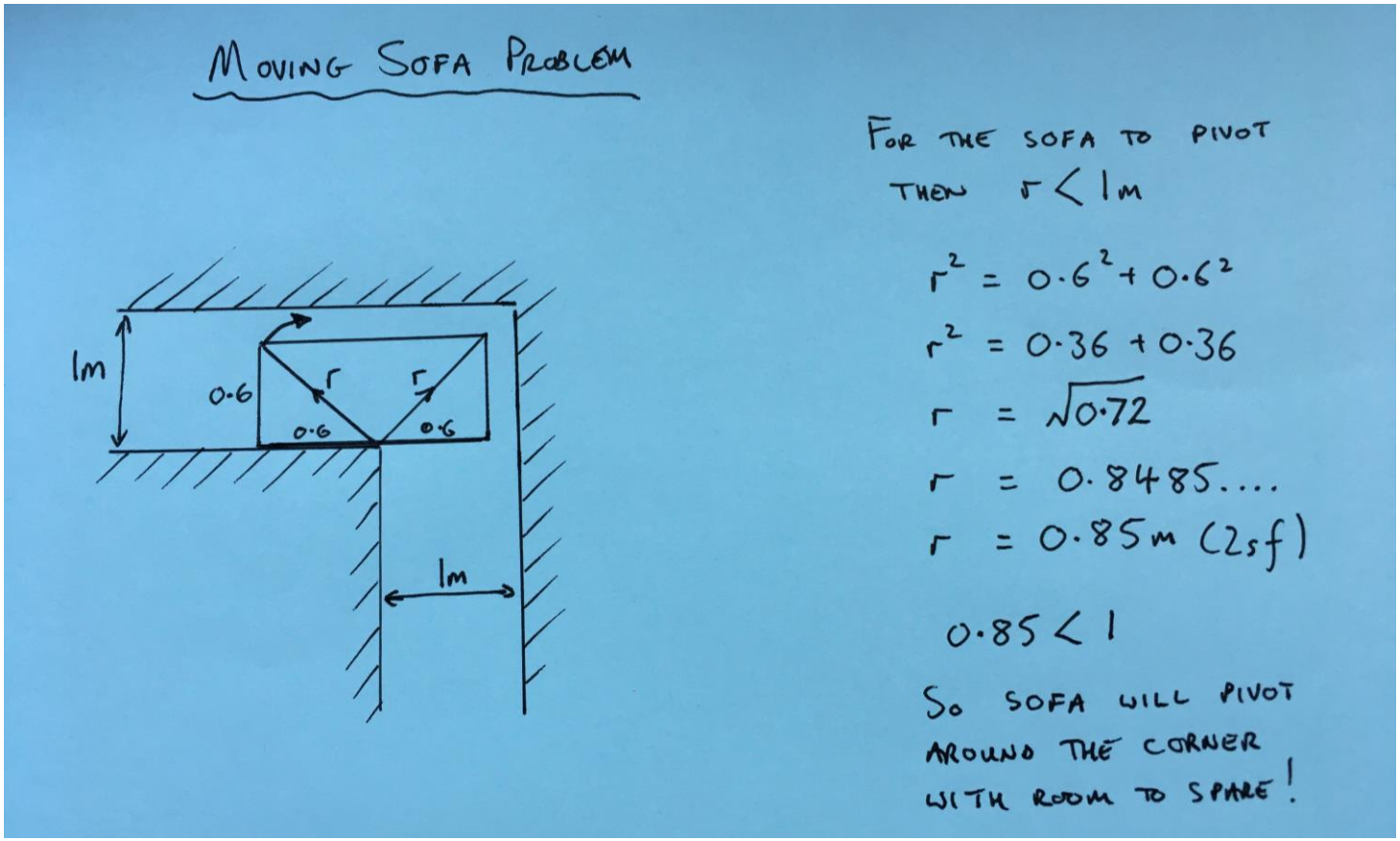
Not to scale

One solution to the question is on the next slide

Try the question on your own before comparing your solution with the one on the next slide.

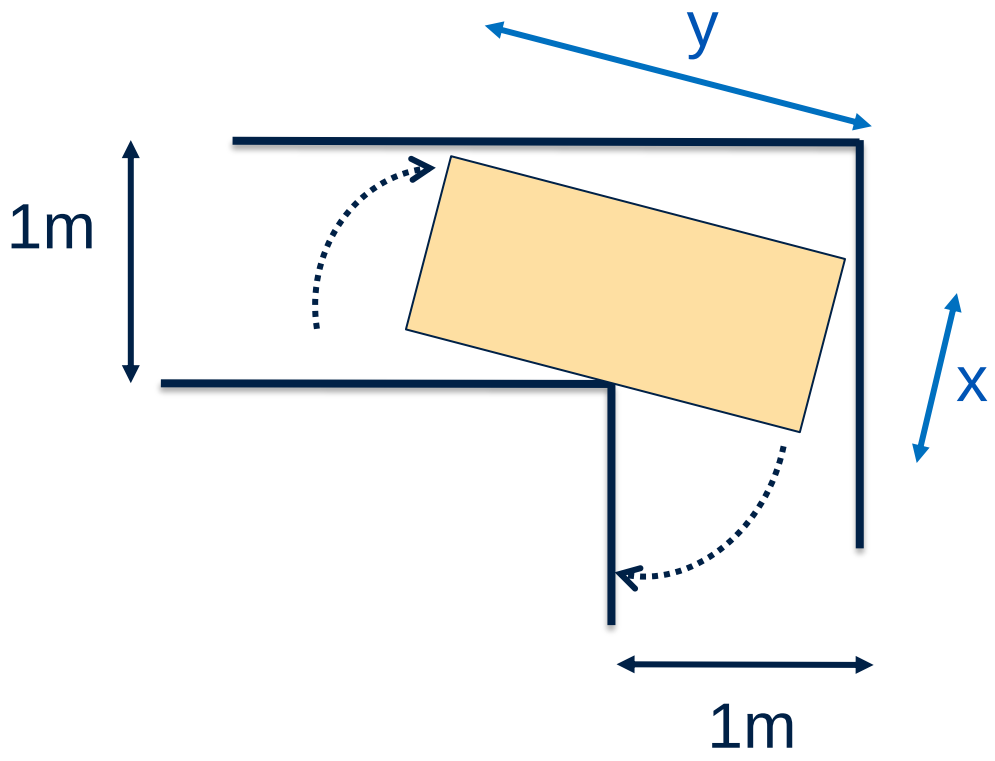
There is more than one way of solving this problem!

One solution – is yours the same?



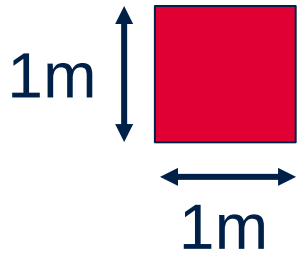
Biggest Sofa?

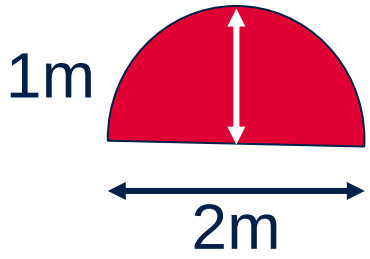
- What is the biggest rectangular sofa that can be taken around the corner?



Further thoughts

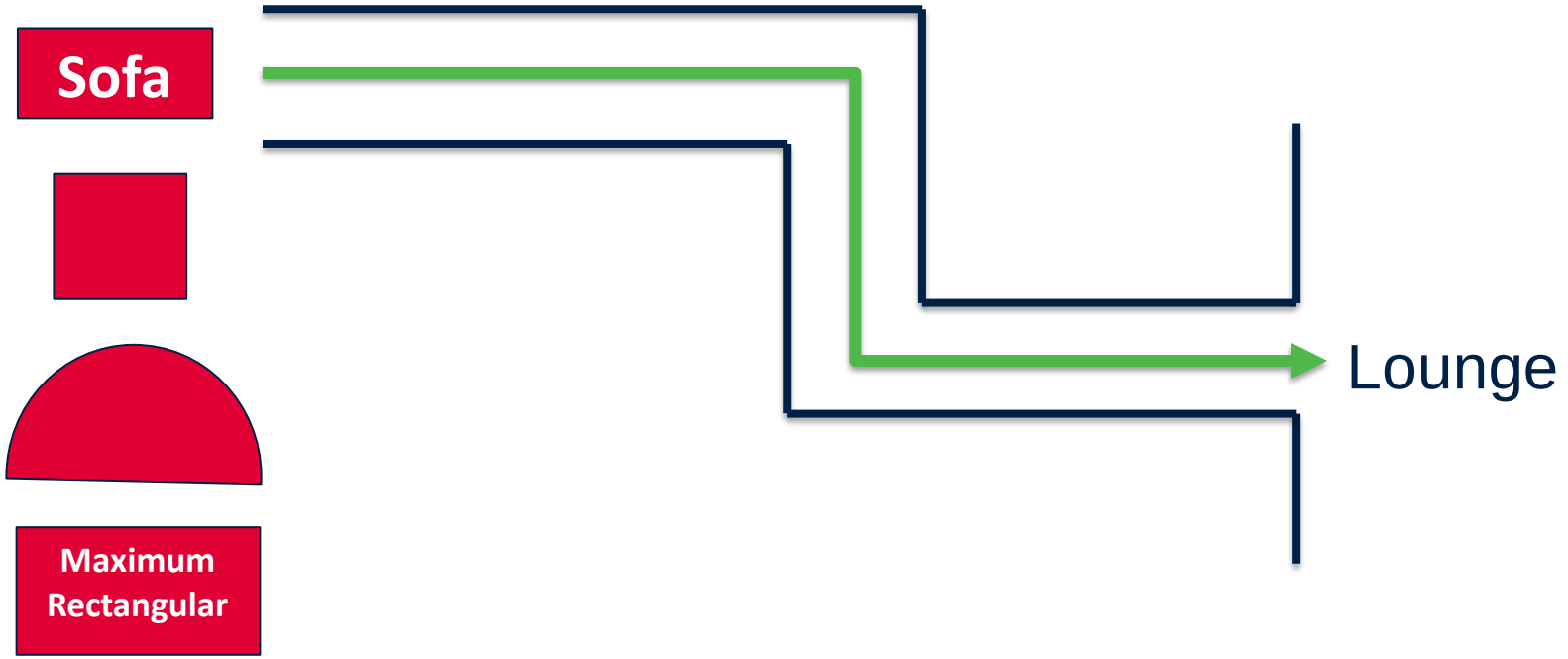
- Can these two unusual Sofas be moved around the corner?





- How does the area of the biggest rectangular sofa compare with these two sofas?

- Which of the previous sofas could definitely be moved along this corridor?

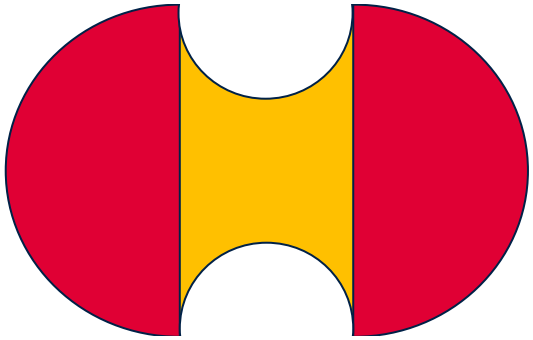


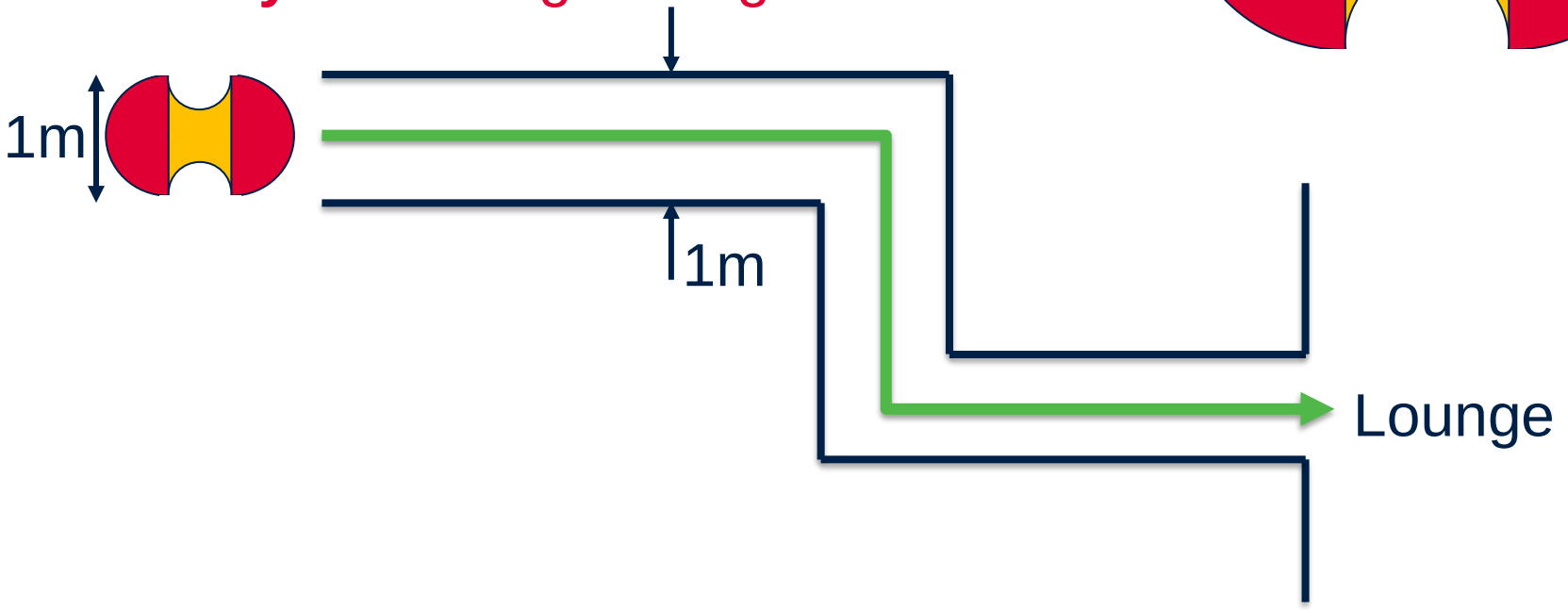
Now watch this video on the Moving Sofa Problem

- Professor Dan Romik explains in this Numberphile video the history of the Moving Sofa problem and his unique solution

Ambidextrous Sofa

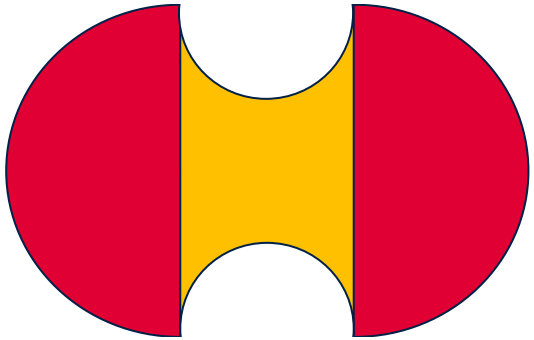
Here is a symmetrical Romik style sofa based on semi-circles and rectangles which we will assume is **always** able to go along the corridor.

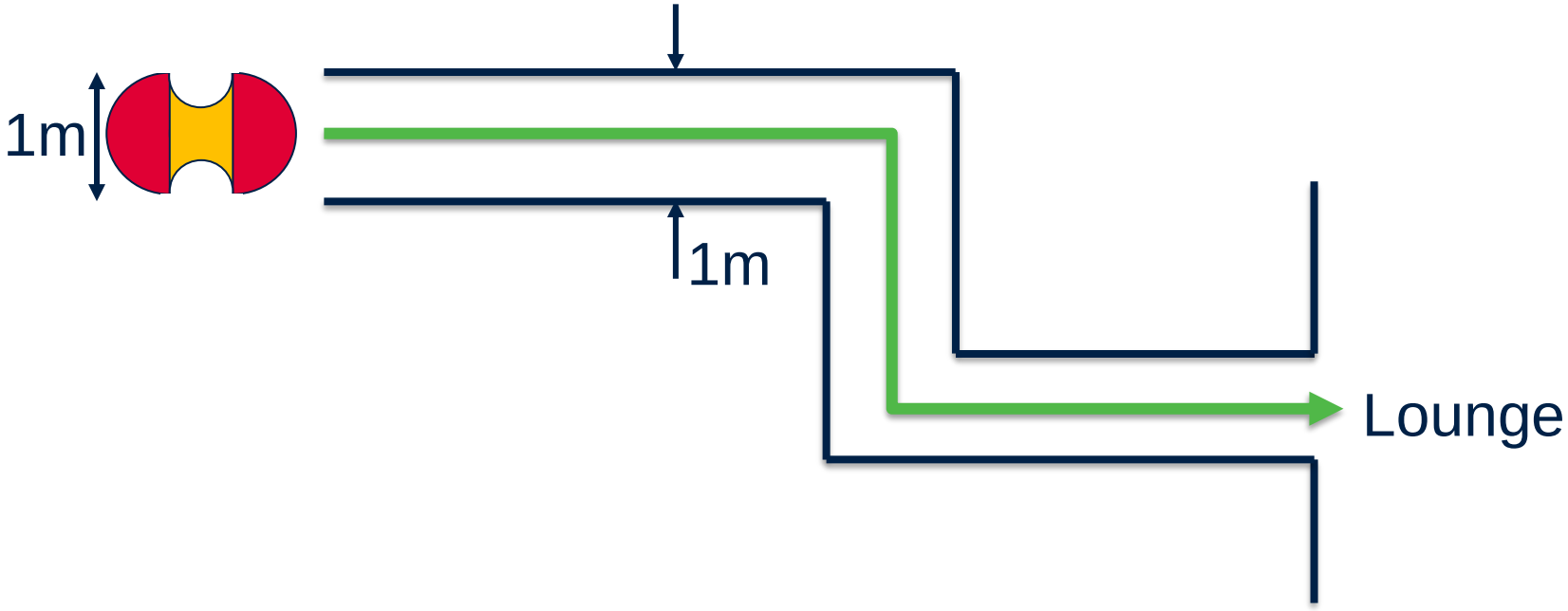




Design Challenge!

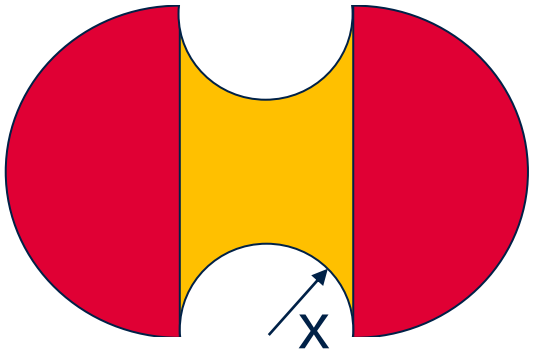
What is the biggest area possible using this Romik style sofa based on circles and rectangles?



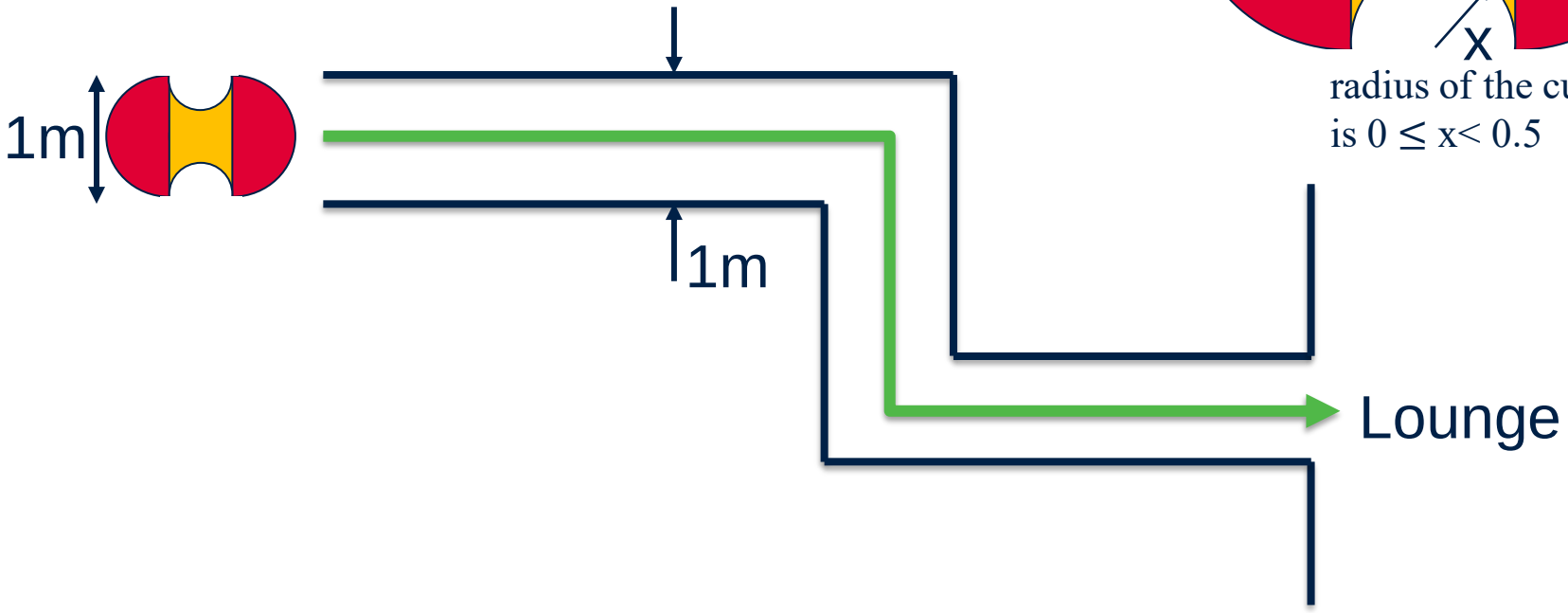


Ambidextrous Sofa

Why not try creating models in card of this sofa and corridor and see if it will **always** go along the corridor.



radius of the cut out is $0 \leq x < 0.5$



Want to know a bit more about the Moving Sofa Problem?

- Dan Romik's blog page - Moving Sofa animations
- Geogebra example – Hammersley sofa

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