

Calc 2

Mobile Project Stage 1a: Shapes

Objective:

The objective of this first stage is to help you decide what shapes you want to use in the construction of your mobile.

You will determine a technique for the calculation of the areas of figures that guarantees they have the area required, decide on shapes you may want to use, determine the correct dimensions for the mobile, draw the shapes in *Mathematica*, and cut out samples.

Mobile shape requirements:

- Use same type material for both shapes
- Use at least two different shapes
- At least one of the shapes has to have a hole

Instructions

Stage 1 of the project is worth 15 points:

5 points: Group presentation and solution to questions in example 1.

5 points: Group presentation and solution to questions in example 2.

5 points: Individual submission of *Mathematica* drawings, sample shapes and typed area calculations.

Group points will be assigned as follows:

2 points: Correctness and completeness of solution (judged from written solution turned in by the group)

2 point: Clarity and technique of solution (judged from written solution and presentation)

1 point: Participation in presentation and solution (judged from written solution and presentation)

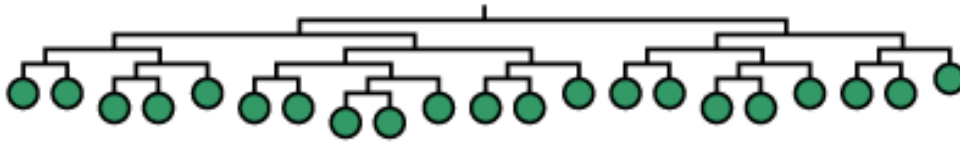
Individual points will be assigned as follows, provided a typed up solution is turned in:

1 point: Correctness and completeness of computations

2 point: Originality

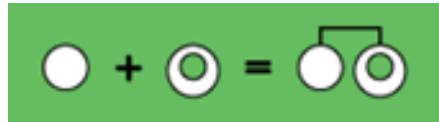
1 point: Mathematica drawings

1 point: Sample shapes for mobile



First Example

Throughout this paper we will refer to the two shapes in this mobile as disk and annulus.



How should we construct a mobile like the one illustrated above which balances at the middle?

Exploration

1. How would you construct the disk and the annulus so that the mobile balances out in the middle?
2. Can you come up with a general formula to relate the areas of the two shapes?
3. What do you think can be learned from this example that will be useful to generalize to other shapes?