

V123

# Template

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# 1 Objective

This experiment serves as a template for a report in the advanced lab course.

## 2 Theory

The Pythagorean theorem describes aspect ratios.

### 2.1 General

We can always write

$$a^2 + b^2 = c^2 \quad (1a)$$

$$a^2 = c^2 - b^2 \quad (1b)$$

for any right triangle.

### 2.2 Specific

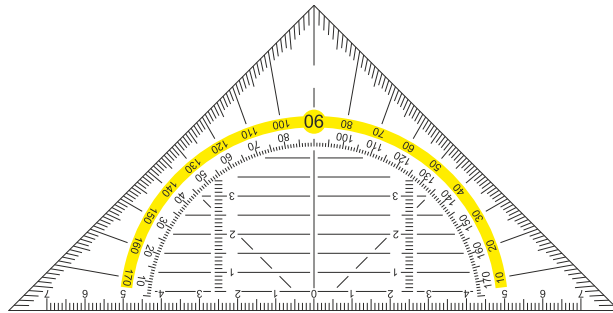
With  $a = b$  follows from the general case (1a) that

$$2a^2 = c^2 \quad (2)$$

must hold.

## 3 Procedure

A *Geodreieck* is used.



**Figure 1:** Schematic depiction of a *Geodreieck*.

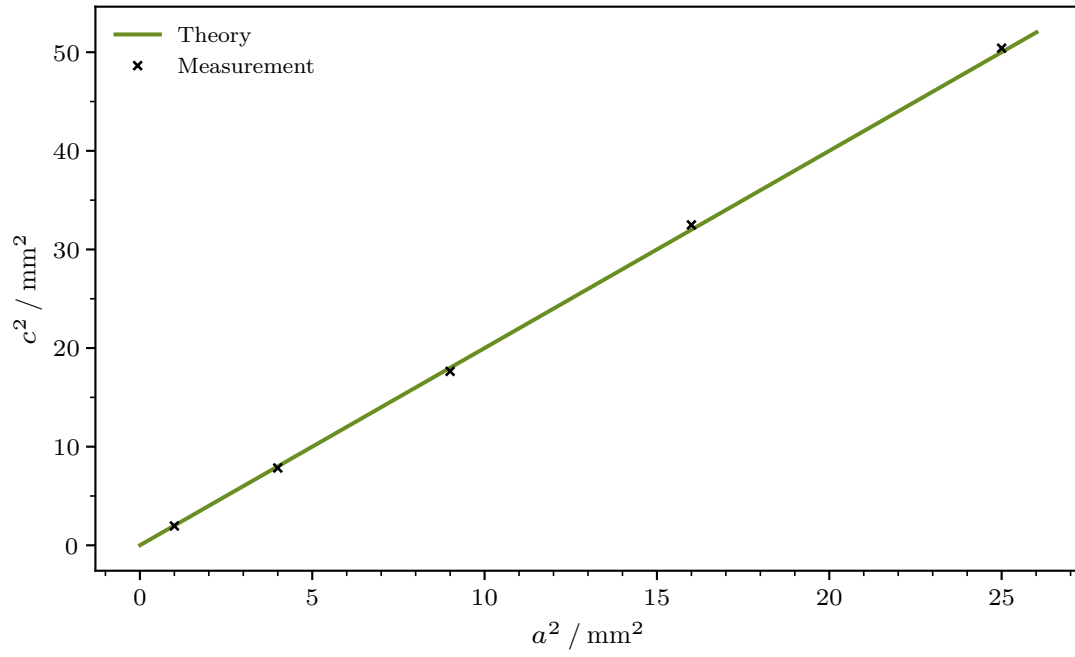
## 4 Results

**Table 1:** General measurements.

$a / \text{mm}$	$b / \text{mm}$	$c / \text{mm}$
1	2	2.25
2	3	3.60
3	4	5.00
4	5	6.40

**Table 2:** Specific measurements.

$a / \text{mm}$	$c / \text{mm}$
1	1.4
2	2.8
3	4.2
4	5.7
5	7.1



**Figure 2:** Measurements and theory prediction.

For  $c^2 = ma^2 + n$  and using `numpy.polyfit` [1] we find

$$m = 2.03 \pm 0.01 \qquad n = (-0.24 \pm 0.21) \text{ mm}^2$$

as parameters.

## 5 Discussion

The measurements are in good agreement with predictions derived from theory.

## References

- [1] Charles R. Harris et al. “Array programming with NumPy”. In: *Nature* 585.7825 (Sept. 2020), pp. 357–362. DOI: 10.1038/s41586-020-2649-2. URL: <https://doi.org/10.1038/s41586-020-2649-2>.

## Appendix

