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Självständigt arbete i matematik

Matematiska institutionen

Stockholms universitet

## **Magnus Åhl: Proofs of certain theorems in geometry – pedagogical benefits from the use of complex numbers**

### **Sammanfattning**

The four plane geometrical theorems Central angle theorem, the formulae for  $\sin(x \pm y)$  and  $\cos(x \pm y)$ , the Nine-point Circle and Morley's trisector theorem are presented, as well as several proofs of each theorem. At least one proof of each theorem makes use of complex numbers. We analyse what we might benefit from this usage, and figure out what properties of complex numbers make this benefit possible.

The conclusion is that often when complex numbers are used to prove plane geometrical theorems, if the problem is arranged in a suitable way, we will not have to rely on genuine ideas in as great extent, but rather the result follows from algebraic calculations. The main reason for this is the result connecting the modulus and arguments in the product of two complex numbers.