

## AGI vrs Average Area

Math 300 Spring 2003 <sup>1</sup>

This is a description of the work done in class on March 31. It will be continued on April 7. It is expected from 1/3 to 1/2 of Essay 3 will be devoted to issues like those raised here. But, some of you may address from different standpoints and certainly with different examples.

Suppose there are two samples of very regular cross sections of crystals. In Sample A each cross section is a 2cm by 2cm square. In Sample B each cross section is a 1cm by 4cm rectangle. (A sheet showing this is available but not online.)

1. Compute the average ‘crystal area’ for each samples A and B.
2. Do sample A and sample B have the same AGI. Hint: give estimates of (upper and lower bounds on) the average grain indicator for each of samples A and B for various kinds of lines.
  - (a) What is the AGI for horizontal lines of length 3.2 cm in each of samples A and B?
  - (b) What is the AGI for vertical lines of length 3.2 cm in each of samples A and B?
  - (c)
  - (d) What is the AGI for 45° lines of length 3.2 cm in each of samples A and B?

In the essay you may want to speculate about the effects of considering random lengths and slopes of line in computing the AGI. Note also that some randomness must be involved in choosing the place where the crystals are counted in the average area method.

---

<sup>1</sup>Adapted from materials developed by the Small Group Mathematical Modeling (SGMM) Project, Purdue University. Copyright by Center for Twenty First Century Conceptual Tools (TCCT), Purdue University. Permission granted for classroom use and research purposes.