

**DEPARTMENT OF MATHEMATICS
UNIVERSITY OF MANITOBA**

FA/MATH 1020 Math In Art, Final Exam, 18 Dec 2006
Paper# 558] [Time 2 hours

Examiners

Dr. R. Padmanabhan, Mathematics
Professor David Lucas, School of Art

LAST NAME: (Print in ink) _____

FIRST NAME; (Print in ink) _____

STUDENT NUMBER: _____

FACULTY: School of Art Science University One

SIGNATURE: _____

(I understand that cheating is a serious offence)

Please show your work clearly.

You may use calculators and drawing instruments like the ruler, compass, protractors etc. However, show all the steps and calculations.

In the construction problems, do not erase the intermediate lines.

Cell phones or other aids are not allowed.

The exam has a total of 8 pages (including this title page) and two blank sheets for rough work. Please check that you have all the pages.

There are 7 questions and each question carries 10 points. The total value of all question is 70.

**Please do not write
in this column**

1. _____/10

2. _____/10

3. _____/10

4. _____/10

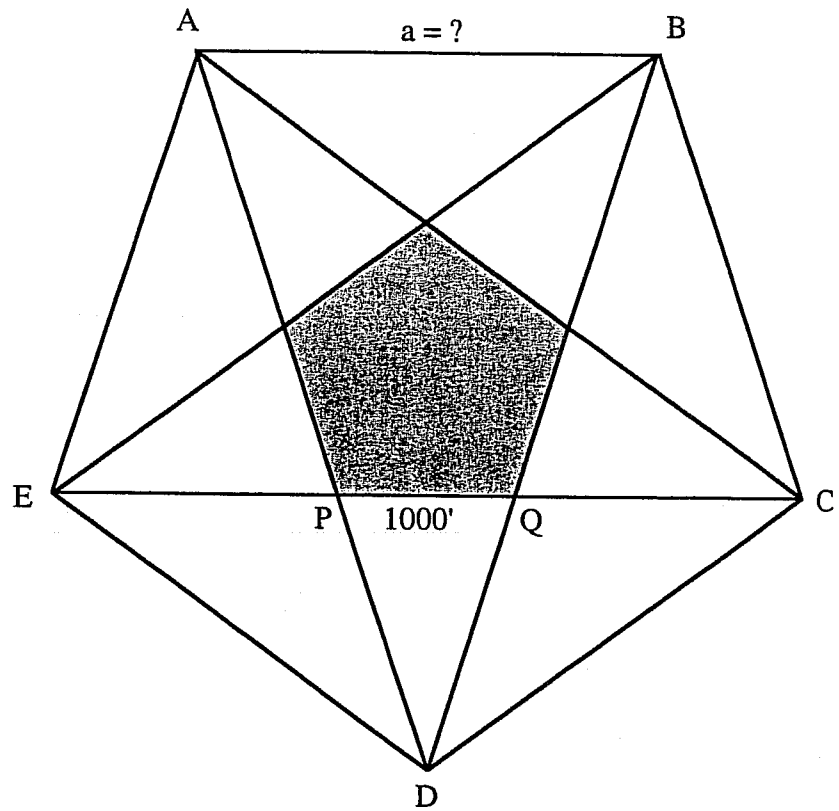
5. _____/10

6. _____/10

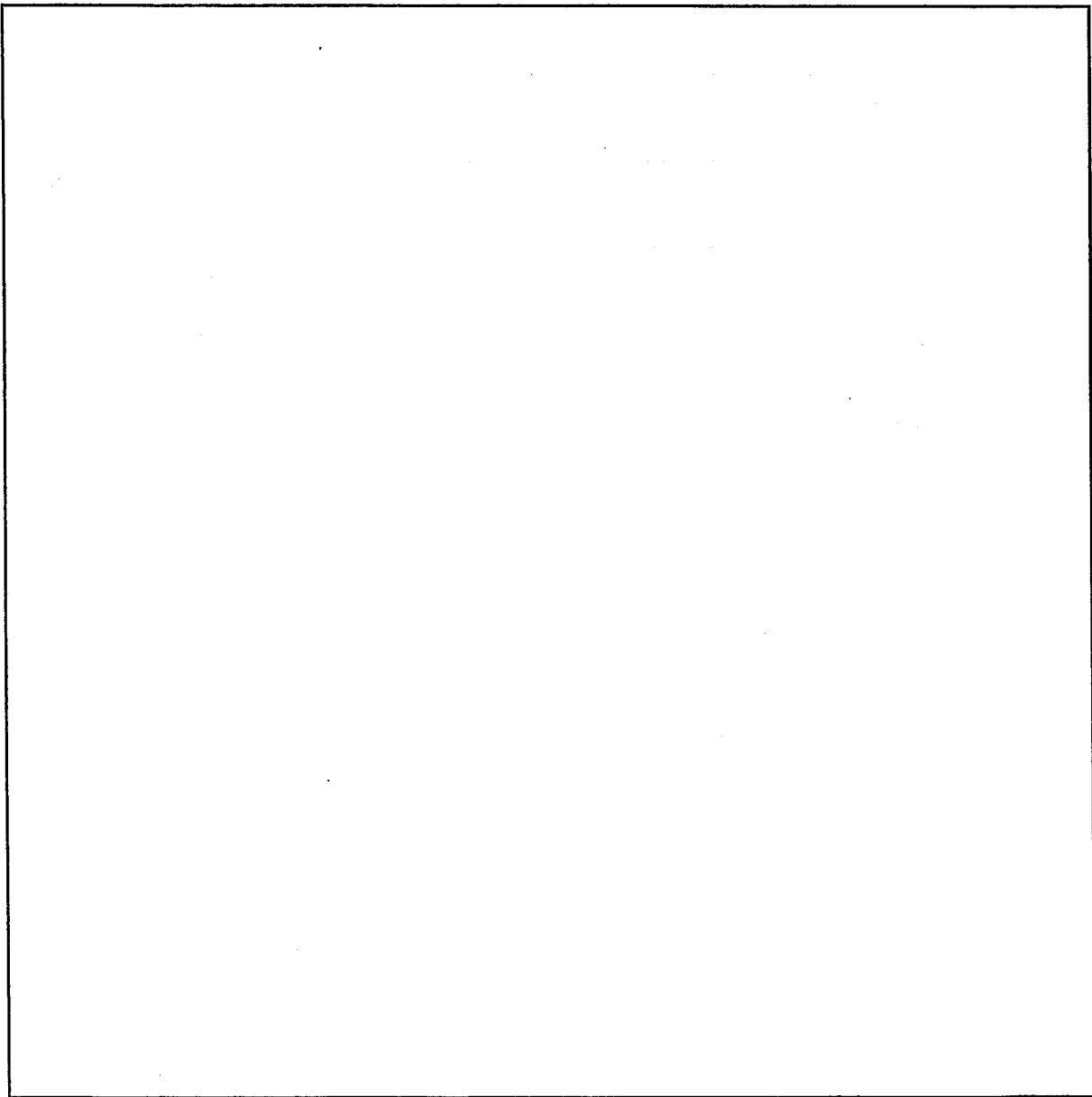
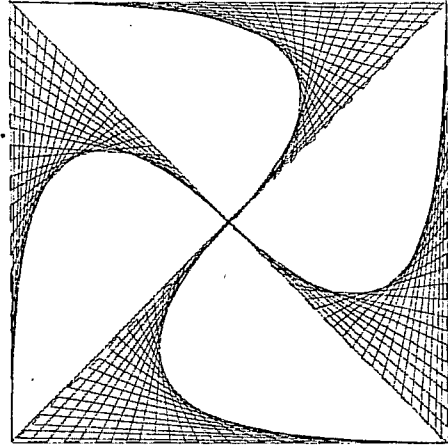
7. _____/10

Total _____/70

2. You are given that the polygon ABCDE in the diagram given below is a *regular* pentagon. If the length of the side PQ of the shaded inner pentagon is 1000', find the value of "a" which is the length AB of the outer pentagon.



4. Using the technique of drawing straight lines as tangents, draw four smooth parabolas in the square given below to create a shape as shown on the right side.



- 6 Apply a sequence of topological transformations (e.g. the continuous moulding of, say the ceramics or clay), to obtain the shape of a face mask shown on the right from the shape of the coffee mug with two handles as shown on the left. Show at least three or four in-between stages.

