

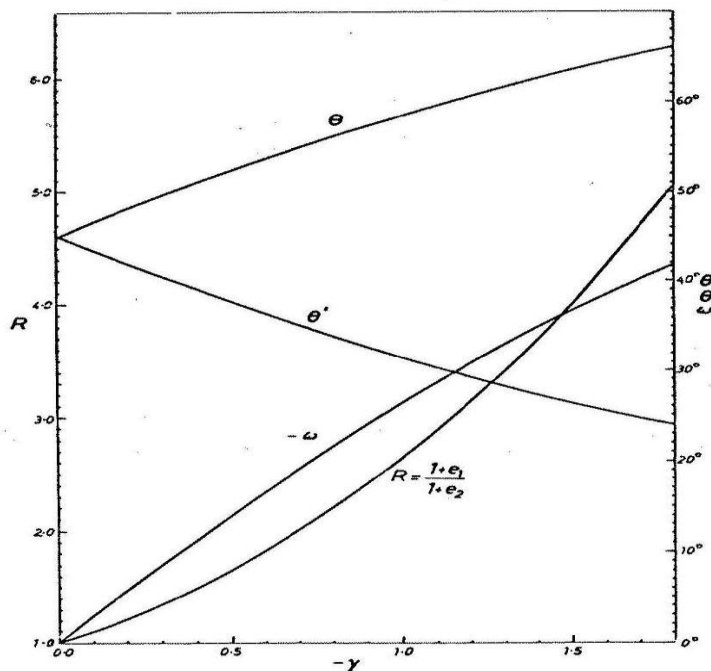
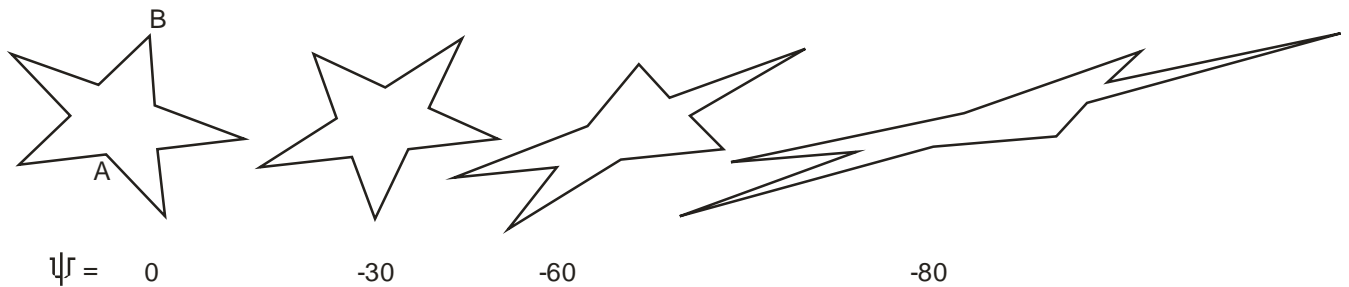
STRUCTURAL GEOLOGY

Final Exam Questions

27th May 2009

1. The star below has been deformed by simple shear.

- a) Calculate the longitudinal and angular changes along AB.
- b) Make a plot of shear strain versus longitudinal and angular changes along AB.
- d) Using the diagram below find out the ellipticity values associated with the first two deformed stars.



2. a) The following strike and dip readings have been measured around a fold: 32/48NW, 127/69SW, 35/43NW, 31/48NW, 131/72SW. Using stereographic projection find out the trend and the plunge of the fold axis.

b) Find out the strike and dip of the plane that includes the lines 168/88SE and 15/14NE.

3. The following maximum, intermediate and minimum axis of ooids have been measured in a deformed limestone:

	max	interm	min
ooid 1:	1.1 mm	1.0 mm	0.3 mm
ooid 2:	3.0 mm	2.7 mm	0.5 mm
ooid 3:	2.5 mm	2.3 mm	0.4 mm

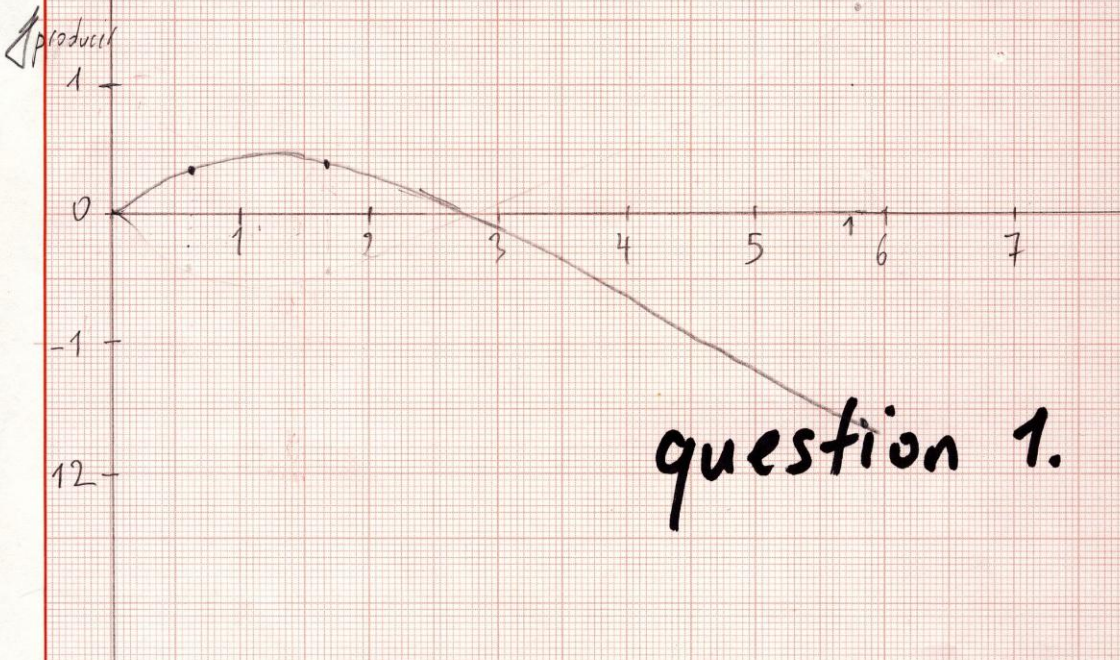
- a) Determine the principal axial ratios and show them on a Flinn diagram.
 - b) What are the k-values of the deformed oolites?
 - c) Assuming that there has been no volume change during the deformation calculate the e_1 , e_2 and e_3 values.
4. a) What is the relation between cleavage, mineral stretching lineation and the finite strain ellipsoid.
 b) How would you differentiate a normal fault from a reverse fault in the field?
 c) With the help of diagrams explain as how transtension and transtensional structures form within a strike-slip fault zone.
 d) With the help of diagrams explain the difference between a parallel fold and similar fold.
 e) What are the factors that control brittle versus ductile deformation?

Bonus questions:

1. What are the differences between continental and oceanic crust?
2. What is the main mineral in the upper mantle?
3. What is the commonest element in the continental upper crust?

ψ_{applied}		-0.58	-1.73	-5.67
ψ_{produced}	0°	-30	-60	-80
AB	165 mm	215 mm	360 mm	650 mm
e	0	0.30	0.94	2.94
ψ_{produced}	0	+19°	+20.5	-58
ψ_{produced}		-0.34	-0.37	+1.60
R	0	1.8	4.8	

(1)
 Structural
 Geology
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 final exam

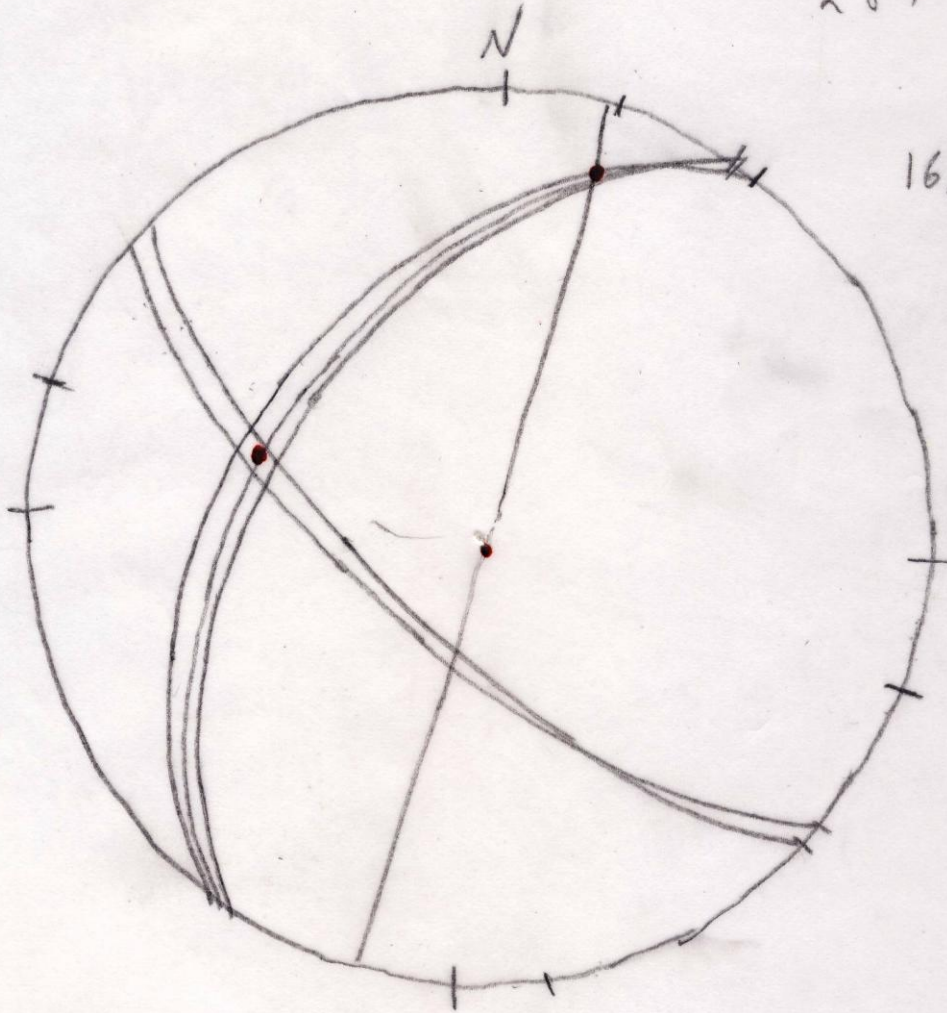


question 1.

question 2

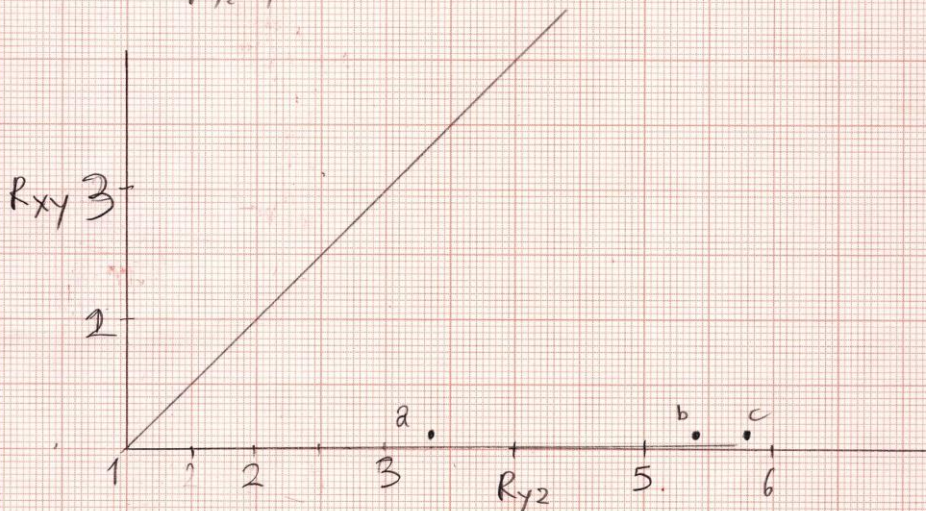
107145 NW
287145 NW

16188 SE



3.	a	b	c	R_{xy}	R_{y2}	R_{x2}	k
	max	interm	min				
a	1.1 mm	1.0 mm	0.3 mm	1.1	3.3	3.6	0.04
b	3.0 mm	2.7 mm	0.5 mm	1.1	5.4	6.0	0.03
c	2.5 mm	2.3 mm	0.4 mm	1.1	5.8	6.3	0.02

$$k = \frac{R_{xy} - 1}{R_{y2} - 1}$$



$\sqrt{2}$	e_1	e_2	e_3	
a	0.69	0.59	0.45	-0.57
b	1.59	0.89	0.70	-0.69
c	1.32	0.89	0.74	-0.70

question 3.