

# STRUCTURAL GEOLOGY

## Mid-Term Exam Questions

16th April 2014

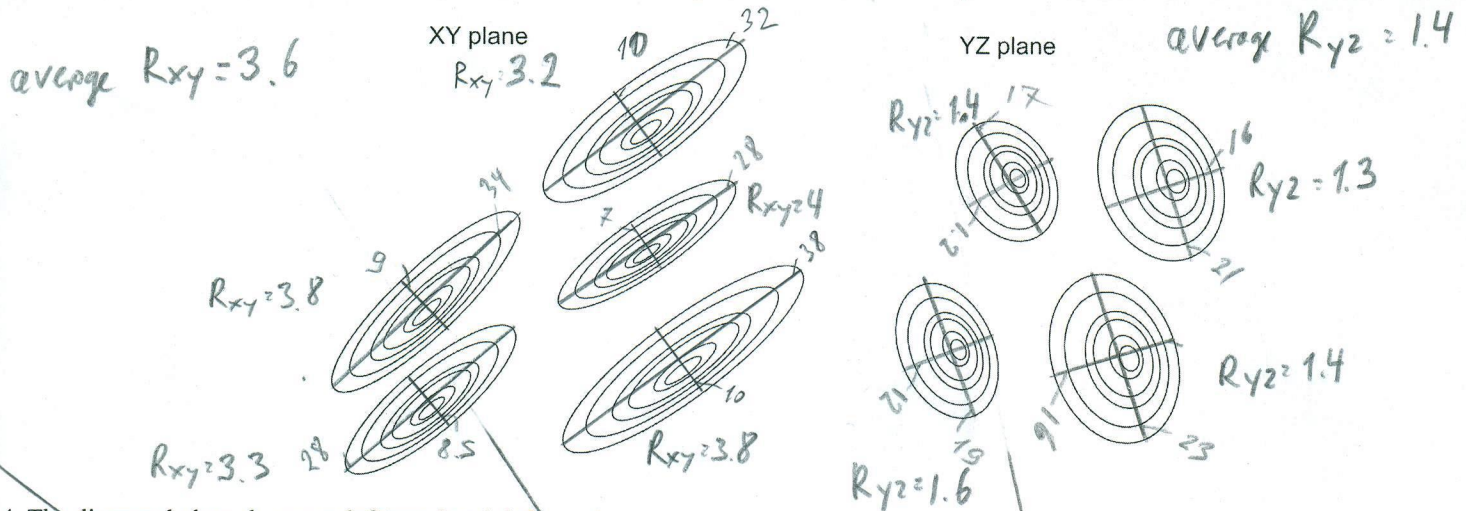
### 1. Using stereographic projections

- The measurements of strike and dip around a fold are: 48/57NW, 125/16NE, 53/53NW, 51/55NW and 130/12NE. Find out the trend and plunge of the fold axis.
- Bedding at 168/34Sw has been cut by cleavage at 133/78SW. Find the trend and plunge of the intersection lineation.
- Pass a plane through the lines 18/67NE and 88/12W. Find out the strike and dip of this plane.

### 2. Provide short answers to the following questions:

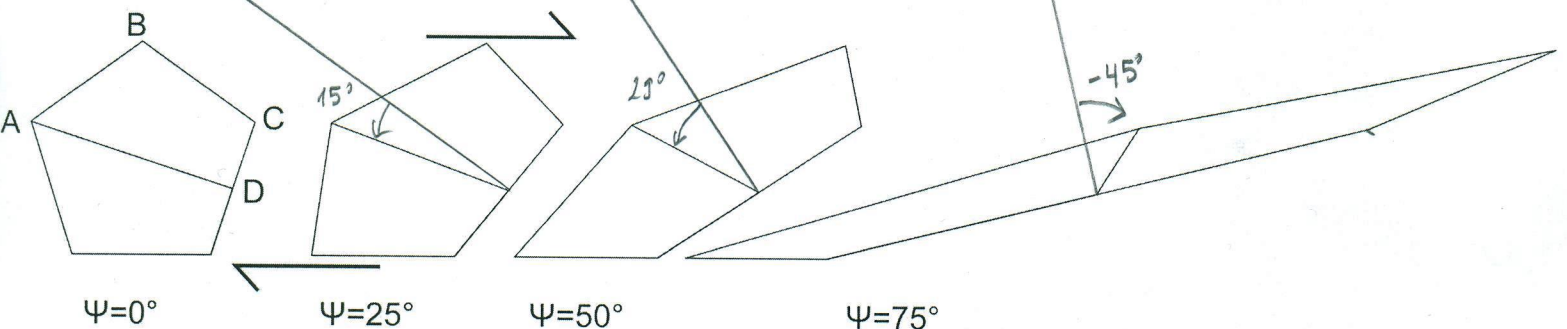
- What is the relation between cleavage plane, mineral stretching lineation and the axes of the finite strain ellipsoid. Explain your answer with the help of a diagram.
- Draw a block diagram of a fault and on this diagram show fault plane, horizontal and vertical slip, slickensides, hanging-wall and foot-wall.
- What are the factors that control the ductile versus brittle behaviour of the rocks?
- Explain pure shear and simple shear with the help of diagrams.
- What is the difference between mineral lineation and intersection lineation?

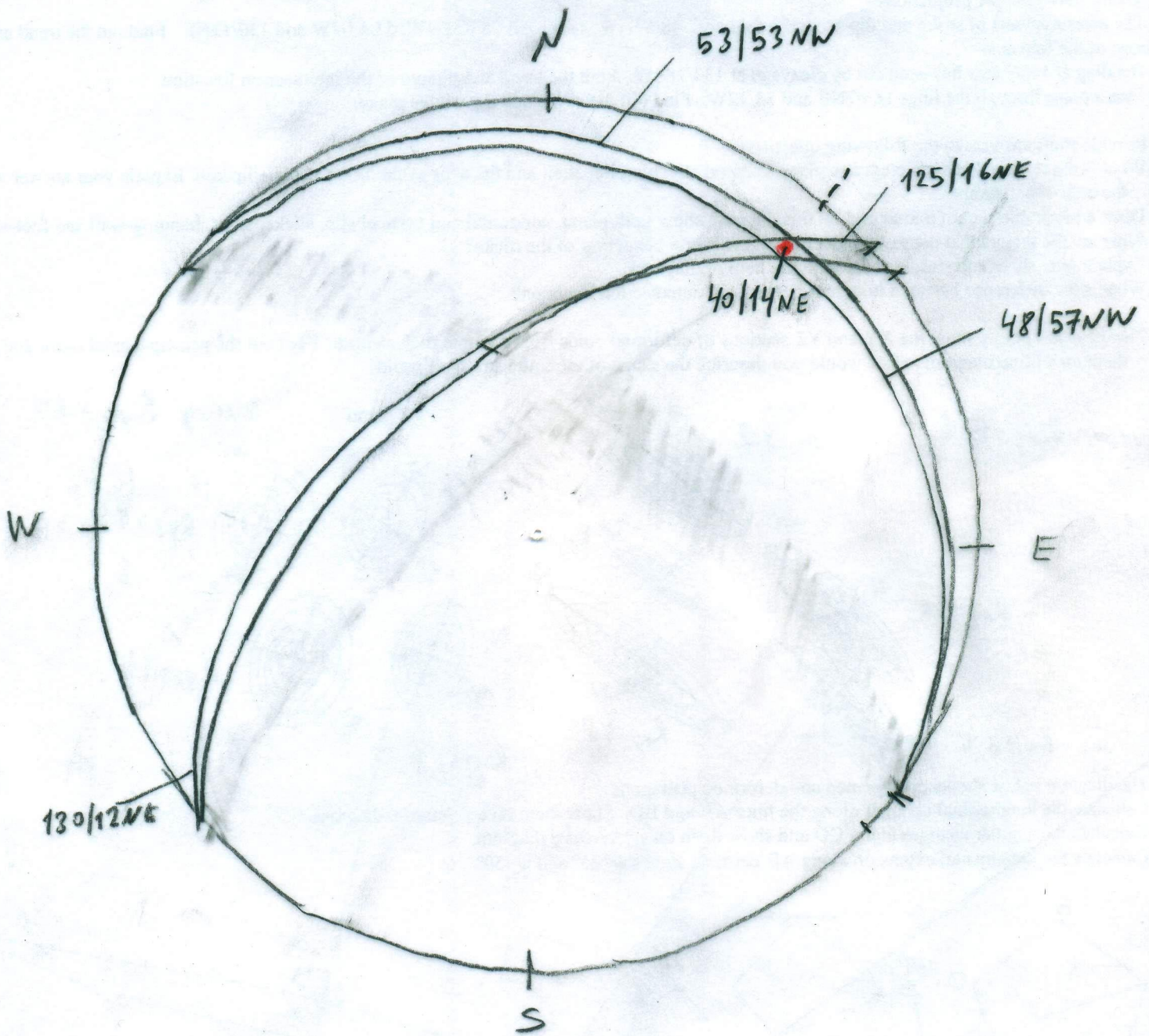
### 3. The diagrams below show the XY and YZ sections of deformed ooids from a single rock sample. Find out the principal axial ratios and show them on a Flinn diagram. How would you describe the shape of the finite strain ellipsoid?



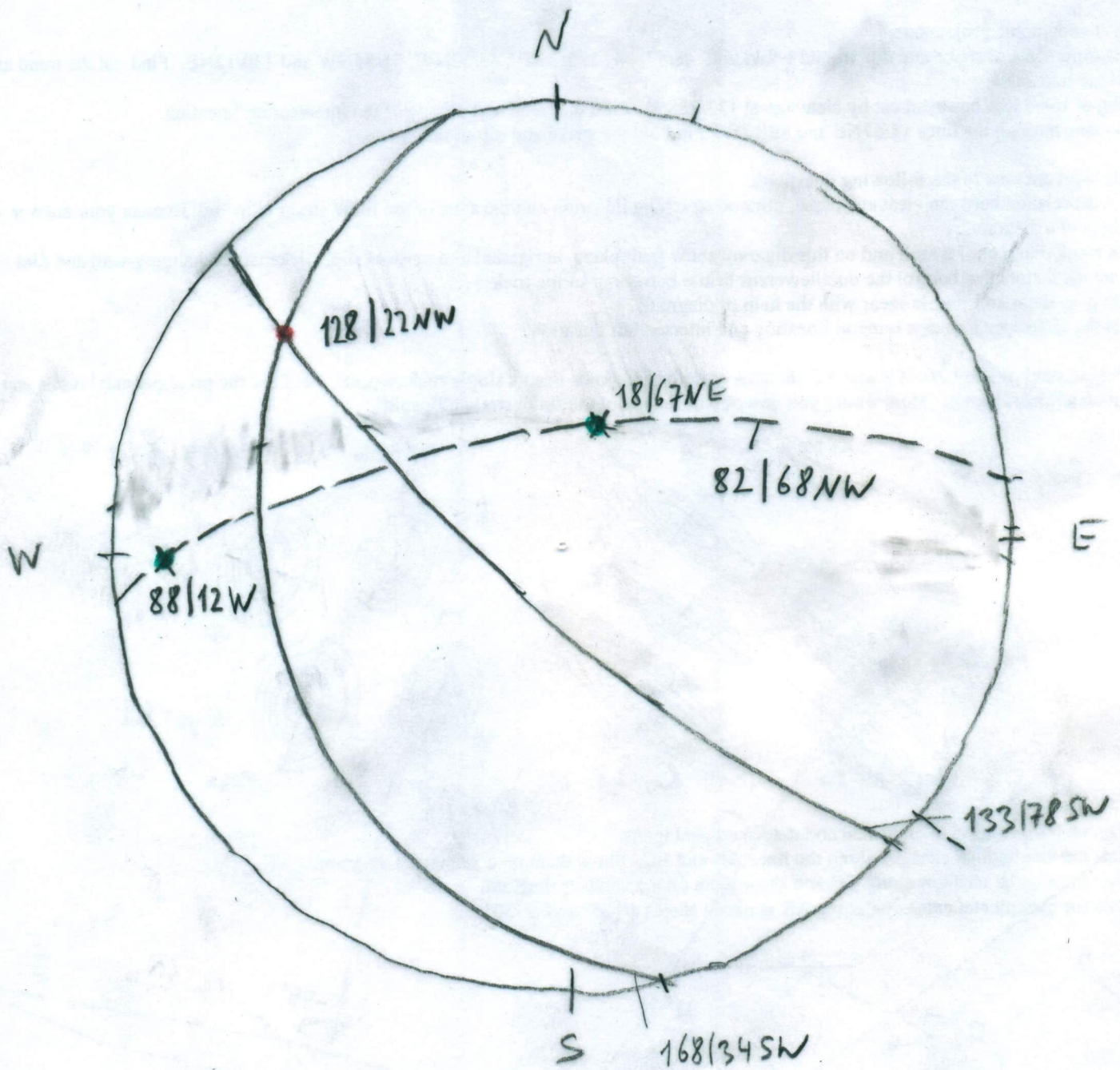
### 4. The diagram below shows undeformed and deformed pentagons.

- Calculate the longitudinal changes along the lines AB and BC. Show them on a  $\gamma$  versus  $e$  diagram.
- Calculate the angular changes along CD and show them on a  $\gamma$  versus  $\gamma$  diagram.
- Calculate the incremental extension along AB between stages  $\psi = 25^\circ$  and  $\psi = 50^\circ$ .





12) The trend and plunge of the focal axis are 40/14 NE



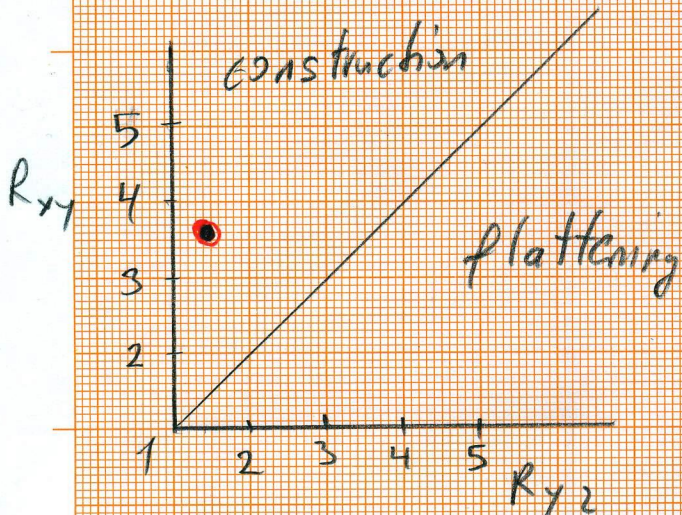
1b) The trend and plunge of the intersection lineation are 128/22 NW

c) The strike and dip of the plane are 82/68 NW

### Answer 3

$$\text{average } R_{xy} = 3.6$$

$$\text{average } R_{yz} = 1.4$$



The final slope is constrictional

### Answer 4c

$$AB_{25} = 23 \text{ mm}$$

$$AB_{50} = 30 \text{ mm}$$

$$e_{inc} = \frac{30 - 23}{23} = 0.30$$

### Answer 4d

$$AB_{50} = 30 \text{ mm}$$

$$AB_{75} = 56 \text{ mm}$$

$$e = \frac{56 - 30}{30} = 0.8\bar{6}$$

$$\dot{e} = \frac{e}{t} = \frac{0.8\bar{6}}{5 \times 60} = 0.0029 \text{ s}^{-1}$$

Answer 4

$\psi$	$f$	AB mm	$e_{AB}$	BC	$e_{BC}$	$\psi_{\widehat{AOC-90^\circ}}$	$f_{\widehat{AOC-90^\circ}}$
0	0.00	18	0	18	0	0	0
-25°	-0.47	23	0.28	14.5	-0.19	15°	0.27
-50°	-1.19	30	0.67	11	-0.39	29'	0.55
-75°	-3.73	56	2.11	27	0.50	-45°	-1.00

