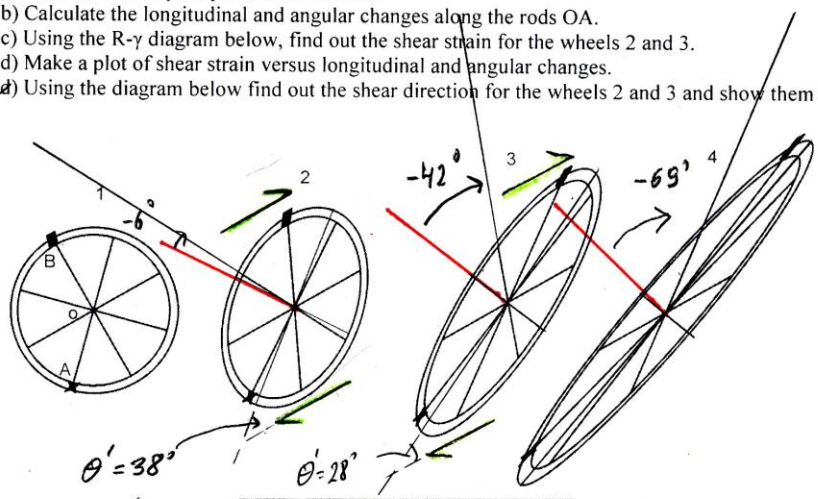
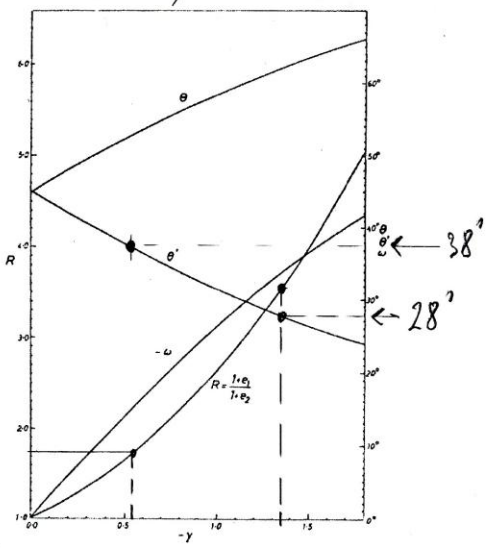
STRUCTURAL GEOLOGY
Mid-Term Exam Questions
1st April 2009

1. The four wheels of a car have been deformed during an accident.

a) Find out the ellipticity R for each wheel.
b) Calculate the longitudinal and angular changes along the rods OA.
c) Using the R-γ diagram below, find out the shear strain for the wheels 2 and 3.
d) Make a plot of shear strain versus longitudinal and angular changes.
e) Using the diagram below find out the shear direction for the wheels 2 and 3 and show them on the diagram.





2. a) The dominant bedding in a region is 118/64SW. The bedding is cut by a cleavage with an average orientation of 54/35SE. Find the trend and plunge of the intersection lineation between the bedding and cleavage.

b) What is the relation between cleavage and the finite strain ellipsoid?
c) Find out the strike and dip of the plane that includes the lines 12/86NE and 167/23SW.

3. Explain the following terms with the help of diagrams:
Axial planar cleavage, pressure solution and stylolites, boudinage, Flinn diagram, kink band

Bonus questions:

1. What are the differences between a mineral, crystal and rock?
2. What are the two commonest elements in the crust?
3. What is the commonest mineral in the continental upper crust?

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question 1)

a)

	1	2	3	4
R	1.	34.0/19.5 = 1.74 (mm/mm)	51.0/14.5 = 3.52 (mm/mm)	73.5/11.0 = 7.35 (mm/mm)

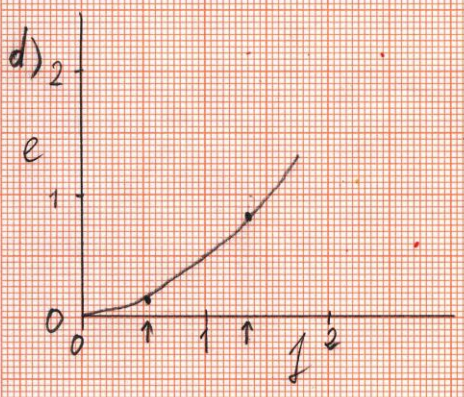
b)

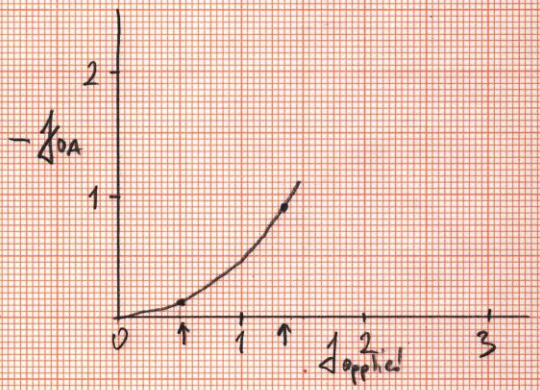
	1	2	3	4
$\overline{OA}_1$	12mm	15.3mm	22.0mm	29.5mm
e	0	0.28	0.83	1.46
ψ_{OA}	0	−6	−42	−69°
γ_{OA}	0	−0.11	−0.90	−2.61

c)

γ	0.53	1.35

d)





e)

θ'	38°	28° angle between the long axis of the strain ellipsoid and shear direction

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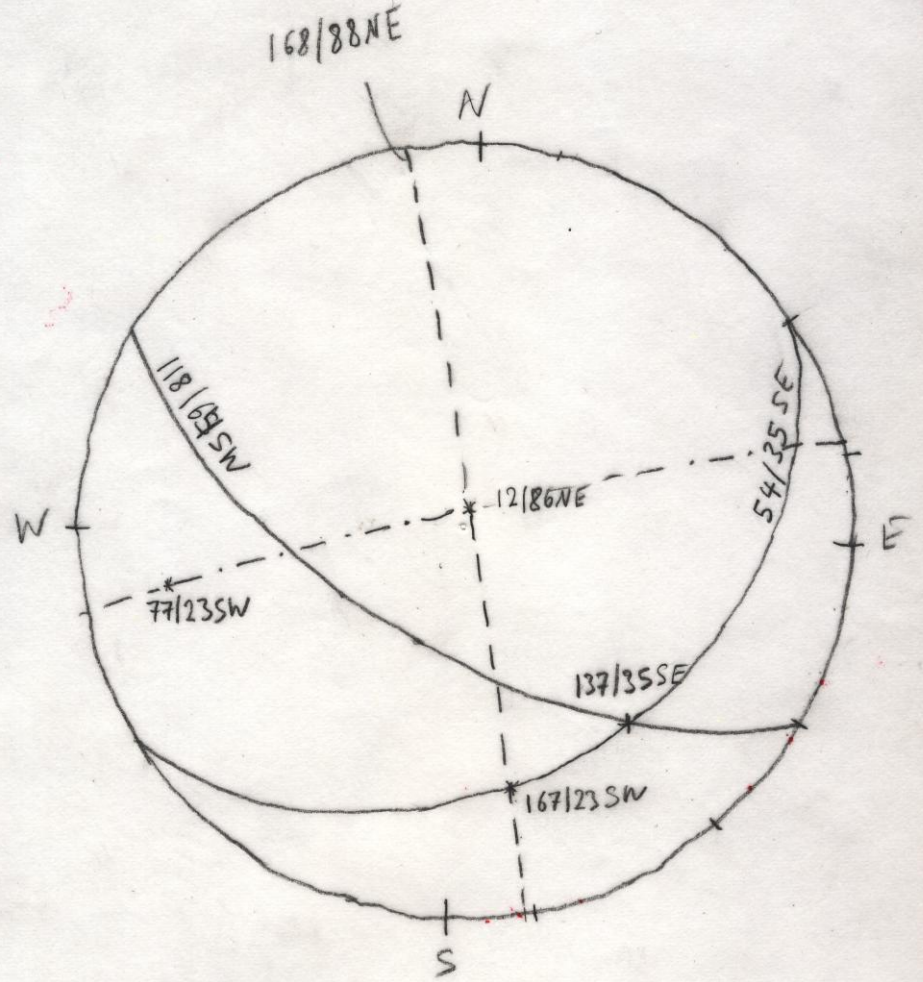
Answer to question 2a & c



2a) 137/35 SE

c) 168/88NE (74/86 NW)