

# 1) Determinants (Additional Exercises)

Suppose  $A, B$  are  $(n \times n)$  real matrices  
Such that  $A + iB$  is invertible

Show that  $\det \begin{pmatrix} A & B \\ -B & A \end{pmatrix} > 0$ .

(Imp. in geometry)

2) The numbers 20604, 53227, 25755,  
20927 and 78421 are all  
divisible by 17. Show that

$\det \begin{bmatrix} 2 & 0 & 6 & 0 & 4 \\ 5 & 3 & 2 & 2 & 7 \\ 2 & 5 & 7 & 5 & 5 \\ 2 & 0 & 9 & 2 & 7 \\ 7 & 8 & 4 & 2 & 1 \end{bmatrix}$  is also divisible  
by 17.

3) Show that a Necessary Condition for

$$x^2 + ax + b = 0 \quad \text{to have a}$$

$$x^2 + px + q = 0$$

Common root is that

Look up linear

Hint: 2. 4 equations

$$\begin{vmatrix} 1 & a & b & 0 \\ 0 & 1 & a & b \\ 1 & p & q & 0 \\ 0 & 1 & p & q \end{vmatrix} = 0.$$

in  $y_1, y_2, y_3, y_4$  with non trivial solution

$$c^3, c^2, c, 1$$

(4) Tut Sheet 3: Q2, Q3, Q9, Q11.