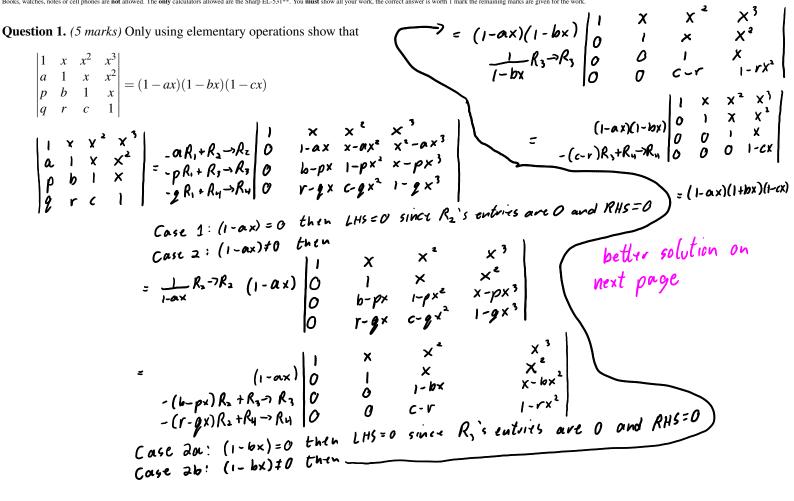
Books, watches, notes or cell phones are not allowed. The only calculators allowed are the Sharp EL-531**. You must show all your work, the correct answer is worth 1 mark the remaining marks are given for the work.



Question 2. (5 marks) By first performing a cofactor expansion along the first column show that

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Question 1. (5 marks) Only using elementary operations show that

$$\begin{vmatrix} 1 & x & x^2 & x^3 \\ a & 1 & x & x^2 \\ p & b & 1 & x \\ q & r & c & 1 \end{vmatrix} = (1 - ax)(1 - bx)(1 - cx)$$

$$LHS = -xR_{2} + R_{1} - R_{1}
-xR_{3} + R_{2} - xR_{2}
-xR_{4} + R_{3} - xR_{3}
q v c 1$$

$$= (1-ax)(1-bx)(1-cx) = RHS$$

Question 2. (5 marks) By first performing a cofactor expansion along the first column show that

$$\begin{vmatrix} 1 & 1 & 0 & 0 & \cdots & 0 & 0 \\ 0 & 1 & 1 & 0 & \cdots & 0 & 0 \\ 0 & 0 & 1 & 1 & \cdots & 0 & 0 \\ \vdots & \vdots & \vdots & \vdots & & \vdots & \vdots \\ 0 & 0 & 0 & 0 & \cdots & 1 & 1 \\ 1 & 0 & 0 & 0 & \cdots & 0 & 1 \end{vmatrix} = 1 + (-1)^{n+1}$$