<u>THEOREM 4</u> — LET E BE AN ELEMENTARY MATRIX.

a) IF E RESULTS FROM MULTIPLYING A ROW OF I BY k, THEN $\det(E) = k$.

b) IF E RESULTS FROM INTERCHANGING TWO ROWS OF I, THEN $\det(E) = -1$.

c) IF E RESULTS FROM ADDING A MULTIPLE OF ONE ROW OF I TO ANOTHER, THEN $\det(E) = 1$.

<u>THEOREM 5</u> — IF A IS A SQUARE MATRIX WITH TWO PROPORTIONAL ROWS OR TWO PROPORTIONAL COLUMNS, THEN $\det(A) = 0$.

TECHNIQUE FOR EVALUATING DETERMINANTS:

START WITH A SQUARE MATRIX A AND PERFORM ELEMENTARY ROW OPERATIONS ON IT (BEING CAREFUL TO NOTE HOW THE DETERMINANT HAS CHANGED) UNTIL AN UPPER TRIANGULAR MATRIX RESULTS.

<u>EX</u>

$$\begin{vmatrix} 0 & 4 & 6 \\ 1 & 2 & 2 \\ 3 & 8 & 10 \end{vmatrix} = - \begin{vmatrix} 1 & 2 & 2 \\ 0 & 4 & 6 \\ 3 & 8 & 10 \end{vmatrix} = - \begin{vmatrix} 1 & 2 & 2 \\ 0 & 4 & 6 \\ 0 & 2 & 4 \end{vmatrix} = - \begin{vmatrix} 1 & 2 & 2 \\ 0 & 4 & 6 \\ 0 & 0 & 1 \end{vmatrix} = -4$$

↑
SWITCH
① & ②

↑
ADD $-3$①
TO ③

↑
ADD $-\frac{1}{2}$②
TO ③