Echelon form WORKSHEET

9/4/03

matrix	Is in EF, or in REF? (circle the pivots)	If in EF or REF, is the lin. sys. with this aug. matrix consistent?	If consistent, is it unique?
a) $\begin{bmatrix} 1 & 8 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$			
b) $\begin{bmatrix} 1 & 0 & 1 & 0 & 0 \\ 0 & 2 & 1 & 1 & 1 \\ 0 & 1 & 0 & 1 & 0 \end{bmatrix}$			
c) $\begin{bmatrix} 2 & 4 & -1 & -3 & 9 \\ 0 & 0 & 5 & 2 & 3 \\ 0 & 0 & 0 & 6 & 0 \end{bmatrix}$			

More fun:

9/14/16.

1) what is the most pivots a 3×5 linear system can have?
a 5×3 linear system?

2) Can a solution to a 7×8 linear system be unique? (why?)

3) If a 3×3 linear system has no solution, what can you say about the number of pivots?

Echelon form WORKSHEET ~ SOLUTIONS ~ 9/4/03

matrix	Is in EF, or in REF? (circle the pivots)	If in EF or REF, is the lin. sys. with this aug. matrix consistent?	If consistent, is it unique?
a) $\begin{bmatrix} \textcircled{1} & 8 & 0 & 0 \\ 0 & 0 & \textcircled{1} & 0 \\ 0 & 0 & 0 & \textcircled{1} \end{bmatrix}$	REF	It's the aug. matrix for 3×3 lin. sys. Since has row $[0\ 0\ 0 \mid 1]$ not cons.	
b) $\begin{bmatrix} \textcircled{1} & 0 & 1 & 0 & 0 \\ 0 & \textcircled{2} & 1 & 1 & 1 \\ 0 & 1 & 0 & 1 & 0 \end{bmatrix}$	neither		
c) $\begin{bmatrix} \textcircled{2} & 4 & -1 & -3 & 9 \\ 0 & 0 & \textcircled{5} & 2 & 3 \\ 0 & 0 & 0 & \textcircled{6} & 0 \end{bmatrix}$	EF (not REF)		no (has one free variable)

note can't label pivot in this row, since not reduced to EF yet!

note: is the size m×n of lin. sys, not of aug. matrix!

$\min(m, n)$

More fun: 9/14/16

1) what is the most pivots a 3×5 linear system can have? 3
   a 5×3 linear system? 3

2) Can a solution to a 7×8 linear system be unique? (why?)
   No, since can have at most 7 pivots, leaving at least one free var.

3) If a 3×3 linear system has no solution, what can you say about the number of pivots? It is less than 3.