

Linear algebra, Spring 2017 — RREF

Class on January 26

A matrix is in **reduced row-echelon form** (RREF) if

1. the first non-zero entry in each row is 1 (this is called a **leading 1**)
2. if a column has a leading 1, then all other entries in that column are 0
3. if a row has a leading 1, then every row above has a leading 1 further left

Exercise 1. Determine which of the following matrices is in RREF. If it's not in RREF, state which rule above is violated.

$$A = \begin{bmatrix} 1 & 0 & 1 & 0 & 3 \\ 0 & 1 & 2 & 0 & 4 \\ 0 & 0 & 0 & 1 & 7 \end{bmatrix}, \quad B = \begin{bmatrix} 1 & 0 & 1 & 0 & 3 \\ 0 & 1 & 2 & 0 & -2 \\ 0 & 0 & 0 & 2 & 3 \end{bmatrix}$$
$$C = \begin{bmatrix} 1 & 0 & 1 & 0 & 3 \\ 1 & 1 & 2 & 0 & 2 \\ 0 & 0 & 0 & 1 & 7 \end{bmatrix}, \quad D = \begin{bmatrix} 1 & 0 & 1 & 0 & 1 \\ 0 & 0 & 0 & 1 & 4 \\ 0 & 1 & 0 & 1 & 3 \end{bmatrix}$$