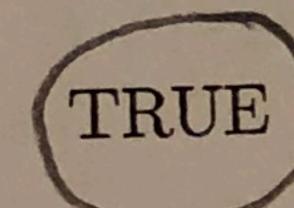
6. [4 pts] Suppose you know that  $\overrightarrow{\mathbf{w}}$  is in ker(B), and you also know that  $B\overrightarrow{\mathbf{v}} = \begin{pmatrix} 1 \\ 2 \\ 2 \end{pmatrix}$ . Use this information to find  $B(3\overrightarrow{w}-2\overrightarrow{v})$ .

$$B\vec{w} = \vec{0} \qquad B\vec{v} = \begin{pmatrix} 1\\2\\3 \end{pmatrix}$$

$$B(3\vec{w} - 2\vec{v}) = 3(B\vec{w}) - 2(B\vec{v})$$

$$= \vec{0} - 2\begin{pmatrix} 1\\2\\3 \end{pmatrix} = \begin{pmatrix} -2\\-4\\-6 \end{pmatrix}$$

- 7. True or false (circle your answer; no justification needed). In all of the problems below, A is an nxn square matrix.
  - (a) [2 pts] If A is the coefficient matrix for some linear system, and rank(A) = n, then the system has a unique solution.



FALSE

(b) [2 pts] If A is the coefficient matrix for some linear system, and rank(A) < n, then the system must have infinitely many solutions.

TRUE

FALSE 
$$\begin{cases} 1 & \text{or solution} \\ 0 & 0 \\ 0 & 0 \end{cases} \begin{pmatrix} 1 & 0 & 0 \\ 0 & 0 & 0 \end{pmatrix} \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 0 \end{pmatrix}$$

(c) [2 pts] If A is the coefficient matrix for some linear system, and the system had a unique so-

lution, then the RREF of A must be precisely the identity matrix  $I_n = \begin{pmatrix} 1 & 0 & 0 & \cdots & 0 \\ 0 & 1 & 0 & & 0 \\ 0 & 0 & 1 & & 0 \\ \vdots & & & \ddots & \\ 0 & 0 & 0 & \cdots & 1 \end{pmatrix}.$ 

