**1.** Perform the following matrix-vector multiplications:

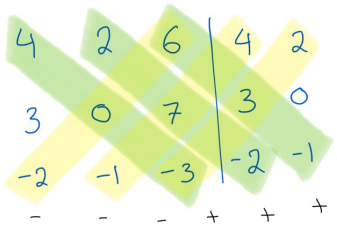
**c.**
$$\begin{bmatrix} 2 & 0 & 0 \\ 3 & -1 & 2 \\ 0 & 2 & -3 \end{bmatrix} \begin{bmatrix} 2 \\ 5 \\ 1 \end{bmatrix} = \begin{bmatrix} 2\times2+0\times5+0\times1 \\ 3\times2+(-1)\times5+2\times1 \\ 0\times2+2\times5+(-3)\times1 \end{bmatrix} = \begin{bmatrix} 4 \\ 3 \\ 7 \end{bmatrix}$$

**5.** Determine which of the following matrices are nonsingular and compute the inverse of those matrices:

**a.**
$$\begin{bmatrix} 4 & 2 & 6 \\ 3 & 0 & 7 \\ -2 & -1 & -3 \end{bmatrix}$$

**b.**
$$\begin{bmatrix} 1 & 2 & 0 \\ 2 & 1 & -1 \\ 3 & 1 & 1 \end{bmatrix}$$

a)



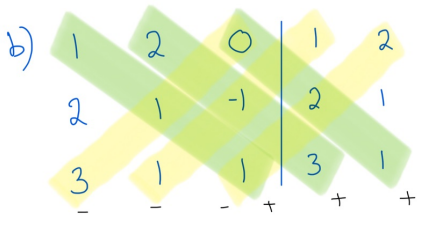

$\det(A) = (4)(0)(-3)+(2)(7)(-2)+(6)(3)(-1)-(6)(0)(-2)-(4)(7)(-1)-(2)(3)(-3)$

$= 0 - 28 - 18 - 0 + 28 + 18$

$= 0$

$\det = 0$ so doesn't have an inverse

b)




$\det(B) = (1)(1)(1)+(2)(-1)(3)+(0)(2)(1)-(0)(1)(3)-(1)(-1)(1)-(2)(2)(1)$

$= 1-6+0+0+1-4$

$= -8$

$\det \neq 0$ so has an inverse

Determine whether the matrix has a determinant, if it does find the inverse.

$$A = \begin{bmatrix} 1 & 4 \\ 7 & 2 \end{bmatrix}$$

$\det A = 1(2) - 4(7) = 2 - 28 = -26 \neq 0$ so has an inverse

$$A^{-1} = \frac{1}{\det} \begin{bmatrix} 2 & -4 \\ -7 & 1 \end{bmatrix} = \frac{1}{-26} \begin{bmatrix} 2 & -4 \\ -7 & 1 \end{bmatrix} = \begin{bmatrix} \frac{2}{-26} & \frac{-4}{-26} \\ \frac{-7}{-26} & \frac{1}{-26} \end{bmatrix} = \begin{bmatrix} \frac{1}{-13} & \frac{2}{13} \\ \frac{7}{26} & \frac{-1}{26} \end{bmatrix}$$