Determinant 2x2 and inverse 2x2

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$$A^{-1} = \frac{1}{\det(A)} \begin{pmatrix} d & -b \\ -c & a \end{pmatrix}$$

$$A = \begin{bmatrix} a & b \\ c & d \end{bmatrix} \qquad \underline{\det(A) = ad - bc}$$

e.g. $A = \begin{bmatrix} \overset{a}{1} & \overset{b}{2} \\ \overset{c}{0} & \overset{d}{-1} \end{bmatrix}$ $\quad \det(A) = (1)(-1) - (2)(0)$

$$= -1 - 0$$

$$\det A = -1$$

inverse of $A = A^{-1} = \frac{1}{\underbrace{\det(A)}_{ad-bc}} \begin{pmatrix} d & -b \\ -c & a \end{pmatrix} = \frac{1}{-1} \begin{pmatrix} -1 & -2 \\ 0 & 1 \end{pmatrix}$

$$= -1 \begin{pmatrix} -1 & -2 \\ 0 & 1 \end{pmatrix}$$

$$A^{-1} = \begin{pmatrix} 1 & 2 \\ 0 & -1 \end{pmatrix}$$