- Recall the definition of the determinant via cofactor expansion.
- If A is a triangular matrix, then $\det A$ is the product of the entries along the main diagonal of A.
- Let A be a square matrix.
  - If a multiple of one row of A is added to another row to obtain the matrix B, then $\det A = \det B$.
  - If Two rows of A are interchanged to produce the matrix B, then $\det B = -\det A$.
  - If one row of A is multiplied by K to produce B, then $\det B = k \det A$.
- A square matrix A is invertible if and only if $\det A \neq 0$.
- If A is an $n \times n$ matrix, then $\det A^T = \det A$.
- If A and B are $n \times n$ matrices, then $\det(AB) = det(A)\det(B)$.
- If A is a 2×2 matrix, the area of the parallelogram determined by the columns of A is $|\det A|$. If A is a 3×3 matrix, the volume of the parallelipiped determined by the colulmns of A is $|\det A|$.

  Special Note: The area of a triangle formed by connecting the points defined by $\vec{0}, \vec{v_1}$, and $\vec{v_2}$ in $\mathbb{R}^2$ is half the area of the parallelogram determine by $\vec{v_1}, \vec{v_2}$, i.e.,

  $$\frac{1}{2}|\det A|,$$

  where A is the matrix with columns consisting of $\vec{v_1}$ and $\vec{v_2}$.