

# NumPy Cheat Sheet

## Creating Arrays

`np.array([1,2,3])` -> From list  
`np.zeros((2,3))` -> 2x3 array of 0s  
`np.ones((2,2))` -> 2x2 array of 1s  
`np.eye(3)` -> Identity matrix 3x3  
`np.arange(0, 10, 2)` -> [0,2,4,6,8]  
`np.linspace(0,1,5)` -> 5 evenly spaced values from 0 to 1  
`np.random.rand(2,2)` -> Random floats 0-1  
`np.random.randint(1,10,(2,2))` -> Random ints

## Array Attributes

`arr.shape` -> Shape (rows, cols)  
`arr.ndim` -> Number of dimensions  
`arr.size` -> Total number of elements  
`arr.dtype` -> Data type of elements  
`arr.itemsize` -> Byte size of one element

## Indexing & Slicing

`arr[2]` -> Third element  
`arr[1:3]` -> Slice  
`arr[0,1]` -> 2D: Row 0, Col 1  
`arr[arr > 2]` -> Boolean filter

## Reshaping

`arr.reshape((2,3))` -> Change shape  
`arr.flatten()` -> Convert to 1D  
`arr.T` or `arr.transpose()` -> Transpose matrix

## Math Operations

`arr + 2, arr * 2` -> Element-wise math  
`np.sum(arr), np.mean(arr)` -> Aggregates  
`np.max(arr), np.min(arr)`  
`np.std(arr), np.var(arr)`

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## Linear Algebra

`np.dot(A, B)` -> Matrix multiplication  
`np.linalg.inv(A)` -> Inverse of matrix  
`np.linalg.det(A)` -> Determinant  
`np.linalg.eig(A)` -> Eigenvalues/vectors

## Miscellaneous

`np.unique(arr)` -> Unique values  
`np.sort(arr)` -> Sorted array  
`np.concatenate([a,b])` -> Join arrays  
`np.split(arr, 2)` -> Split array in 2