1. Array Creation

Create a simple array:

```python
import numpy as np

# Creating an array
a = np.array([1, 2, 3, 4])
print("Array:", a)
```

Create a 2D array of zeros:

```python
zeros_array = np.zeros((3, 4))  # 3 rows, 4 columns
print("Zeros Array:\n", zeros_array)
```

Create an array with evenly spaced numbers:

```python
lin_array = np.linspace(0, 10, 5)  # 5 numbers between 0 and 10
print("Linspace Array:", lin_array)
```

Create random values:

```python
random_array = np.random.rand(3, 2)  # Random values between 0 and 1
print("Random Array:\n", random_array)
```

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2. Array Manipulation

Reshape an array:

```python
b = np.array([1, 2, 3, 4, 5, 6])
reshaped = b.reshape(2, 3)  # Reshape into 2 rows and 3 columns
print("Reshaped Array:\n", reshaped)
```

Concatenate two arrays:

```python
a = np.array([1, 2])
b = np.array([3, 4])
concatenated = np.concatenate((a, b))
print("Concatenated Array:", concatenated)
```

Add a new dimension:

```python
c = np.array([1, 2, 3])
expanded = np.expand_dims(c, axis=0)  # Add as a row
print("Expanded Array:\n", expanded)
```

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3. Mathematical Operations

Basic operations:

```python
x = np.array([1, 2, 3])
y = np.array([4, 5, 6])
```

```
print("Addition:", x + y)  # [5, 7, 9]
print("Multiplication:", x * y)  # [4, 10, 18]
```

Trigonometric functions:

```
angles = np.array([0, np.pi/2, np.pi])
print("Sine:", np.sin(angles))
print("Cosine:", np.cos(angles))
```

Exponentials and logarithms:

```
values = np.array([1, 2, 3])
print("Exponential:", np.exp(values))  # [e^1, e^2, e^3]
print("Natural Log:", np.log(values))
```

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4. Aggregations

Summation and product:

```
a = np.array([[1, 2], [3, 4]])
print("Sum:", np.sum(a))  # Sum of all elements
print("Column-wise Sum:", np.sum(a, axis=0))  # [4, 6]
```

Mean, median, standard deviation:

```
stats_array = np.array([1, 2, 3, 4, 5])
print("Mean:", np.mean(stats_array))
print("Median:", np.median(stats_array))
print("Standard Deviation:", np.std(stats_array))
```

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5. Sorting and Searching

Sorting an array:

```
unsorted = np.array([3, 1, 2])
sorted_array = np.sort(unsorted)
print("Sorted Array:", sorted_array)
```

Index of maximum:

```
a = np.array([10, 20, 5, 40])
print("Index of max:", np.argmax(a))  # Index of 40
```

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6. Boolean and Comparison

Conditional selection:

```
a = np.array([1, 2, 3, 4, 5])
print("Elements greater than 2:", a[a > 2])
```

Logical operations:

```
a = np.array([True, False, True])
print("All true?", np.all(a))  # False
print("Any true?", np.any(a))  # True
```

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7. Linear Algebra

Dot product:

```
a = np.array([1, 2])
b = np.array([3, 4])
print("Dot Product:", np.dot(a, b))  # 1*3 + 2*4 = 11
```

Matrix multiplication:

```
a = np.array([[1, 2], [3, 4]])
b = np.array([[2, 0], [1, 3]])
print("Matrix Multiplication:\n", np.matmul(a, b))
```

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8. Random Number Generation

Generate random integers:

```
rand_ints = np.random.randint(1, 10, size=(3, 3))  # 3x3 matrix with random
integers
print("Random Integers:\n", rand_ints)
```

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9. File I/O

Save and load arrays:

```
# Save an array
a = np.array([1, 2, 3])
np.save('array.npy', a)

# Load the saved array
loaded_array = np.load('array.npy')
print("Loaded Array:", loaded_array)
```