NumPy Revision Sheet

1. Import NumPy

```
import numpy as np
```

2. Array Creation

```
np.array([1,2,3]) np.zeros((2,3)) np.ones((2,3)) np.full((2,3), 5) np.eye(3)
np.random.rand(2,3) np.random.randn(2,3) np.random.randint(1,10,(2,3))
```

3. Array Properties

```
arr.shape, arr.size, arr.dtype, arr.ndim
```

4. Indexing & Slicing

```
arr[0], arr[1,2] arr[0:3], arr[:,1] arr[[0,2]] arr[arr>5]
```

5. Math Operations

```
arr+2, arr*3, arr1+arr2 np.sum(arr), np.mean(arr) np.std(arr), np.min(arr)
np.max(arr), np.argmax(arr) np.sum(arr, axis=0), np.mean(arr, axis=1)
```

6. Reshaping & Combining

```
arr.reshape(2,3) arr.ravel(), arr.flatten() np.hstack([a,b]) np.vstack([a,b])
np.concatenate([a,b], axis=0)
```

7. Broadcasting

```
arr + 5 arr + np.array([1,2,3])
```

8. Normalization

```
minmax = (arr - arr.min()) / (arr.max() - arr.min()) standard = (arr - arr.mean()) /
arr.std()
```

9. One-Hot Encoding

```
y = np.array([0,2,1]) num_classes=3 onehot = np.eye(num_classes)[y]
```

10. Splitting Arrays

```
np.array_split(arr, 3) train_test_split from sklearn.model_selection
```

11. Random Seed

```
np.random.seed(1) # reproducibility
```

12. Problems Solved

```
- Normalization (min-max & z-score) - One-hot encoding - Splitting into batches -
Top-k per row with argsort()
```