

# Worksheet

## Part 1. Arrays and shapes

Let  $A$  be a numpy array of shape  $(3,7)$ . What is the shape of `a[:2, 1:].transpose()`?

- (A)  $(6,2)$
- (B)  $(2,6)$
- (C)  $(5,3)$
- (D)  $(6,3)$
- (E)  $(6,)$

## Part 2. Row sums

You are given a 2D numpy array in the variable `a`. Produce a version of `a` that has each row multiplied by a number so that the sum over the row is one. Store it in the variable `a.normalized`. Use the function `numpy.sum` to compute the row sums. Its documentation is reproduced (in part) below.

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```
numpy.sum(a, axis=None)
```

Sum of array elements over a given axis.

Parameters:

- `a`: array. Elements to sum.
- `axis`: None or int. Axis or axes along which a sum is performed. The default (`axis = None`) is perform a sum over all the dimensions of the input array. `axis` may be negative, in which case it counts from the last to the first axis.

```
import numpy as np
```

### Part 3. Numpy indexing

Write a piece of code that produces a  $10 \times 10$  multiplication table in the variable `mult_table`:

```
0 0 0 0
0 1 2 3
0 2 4 6
0 3 6 9
```

Do not use any for loops.

```
import numpy as np
```