

# Mean of datasets

TOTAL POINTS 6

1. What is the mean of the dataset  $\mathcal{D} = \{1, 2, 3\}$ ?

Do the exercises using pen and paper.

- ☐ 3
- ☐ 6
- ☒ 2



Correct

That's it. Good job!

2. Compute the mean of the following dataset:

$$\mathcal{D} = \left\{ \begin{bmatrix} 1 \\ 4 \\ 7 \end{bmatrix}, \begin{bmatrix} 2 \\ 5 \\ 8 \end{bmatrix}, \begin{bmatrix} 3 \\ 6 \\ 9 \end{bmatrix} \right\}$$

Do the exercises using pen and paper.

- ☒  $\begin{bmatrix} 2 \\ 5 \\ 8 \end{bmatrix}$
- ☐  $\begin{bmatrix} -2 \\ -5 \\ -8 \end{bmatrix}$
- ☐  $\begin{bmatrix} 6 \\ 15 \\ 24 \end{bmatrix}$



3. What is the mean of the following dataset, **after** multiplying each sample in the dataset by 2?

$$\mathcal{D} = \left\{ \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}, \begin{bmatrix} 3 \\ 4 \\ 5 \end{bmatrix}, \begin{bmatrix} 5 \\ 3 \\ 1 \end{bmatrix} \right\}$$

☐  $\begin{bmatrix} 18 \\ 18 \\ 18 \end{bmatrix}$

☐  $\begin{bmatrix} 3 \\ 3 \\ 3 \end{bmatrix}$

☒  $\begin{bmatrix} 6 \\ 6 \\ 6 \end{bmatrix}$

✓ Correct  
Well done!

4. What is the mean of the following dataset, **after** adding  $\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$  to each sample in the following dataset?

$$\mathcal{D} = \left\{ \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}, \begin{bmatrix} 3 \\ 4 \\ 5 \end{bmatrix}, \begin{bmatrix} 5 \\ 3 \\ 1 \end{bmatrix} \right\}$$

☐  $\begin{bmatrix} 3 \\ 3 \\ 3 \end{bmatrix}$

☐  $\begin{bmatrix} 2 \\ 1 \\ 0 \end{bmatrix}$

☒  $\begin{bmatrix} 4 \\ 5 \\ 6 \end{bmatrix}$

✓ Correct  
Well done!



5. Assuming that we know the mean  $\bar{x}_{n-1}$  of a dataset  $\mathcal{D}_{n-1}$  with  $n-1$  data points. Now, suppose that we collect another data point, which we denote by  $x_*$ . Select the correct formula that computes the correct new mean  $\bar{x}_n$  of the full data set  $\mathcal{D}_n = \mathcal{D}_{n-1} \cup \{x_*\}$ , i.e., we add  $x_*$  to the dataset  $\mathcal{D}$ .

- ☐  $\bar{x}_n = \bar{x}_{n-1} + \frac{1}{n-1}(x_* - \bar{x}_{n-1})$
- ☐  $\bar{x}_n = \bar{x}_{n-1} + \frac{1}{n-1}(x_* - \bar{x}_{n-1})$
- ☒  $\bar{x}_n = \bar{x}_{n-1} + \frac{1}{n}(x_* - \bar{x}_{n-1})$
- ☐  $\bar{x}_n = \bar{x}_{n-1} + \frac{1}{n-1}(\bar{x}_{n-1} - x_*)$

✓ Correct  
Excellent!

6. Assuming you are given an image as a two dimensional array of shape 28 x 28. Write a small piece of python code to reshape this image to a vector of length 784 (=28 x 28).

Hint: This can be a one-liner.

```
1 import numpy as np
2
3 def reshape(x):
4     """return x_resaped as a flattened vector of the multi-dimensional array x"""
5     x_resaped = x.flatten()
6     return x_resaped
7
```

Run

Reset

No Output

✓ Correct

Good job!