1-

- **The key reasons for reducing the dimensionality of a dataset:**

- speed up the training algorithm.

- visualization purpose

- saving space

- **Disadvantages**

- information lost

- hard to interpret

- add complexity

2 - The dimensionality curse is an overfit training dataset

3 - **No, dimensionality reduction is not reversible in general**. It loses information.

4 - **PCA can be used to significantly reduce the dimensionality of most datasets, even if they are highly nonlinear** because it can at least get rid of useless dimensions. However, if there are no useless dimensions, reducing dimensionality with PCA will lose too much information.

5 - It depends on dataset. We can’t give result with accuracy.

6 -

- Vanilla PCA: the dataset fit in memory

- Incremental PCA: largest dataset that don't fit in memory, online task

- Randomized PCA: considerably reduce dimensionality and the dataset fit the memory.

- Kernel PCA: used for nonlinear PCA

7 -

- Measure the reconstruction error

- Measure the performance in second Machine Learning algorithm

8 - Yes