1. Consider the following probability distribution for a random variable X.   `1 point`

X	1	3	5
$P(X)$	0.3	0.4	0.3

What is the expected mean $E[X]$ for this probability distribution?

○ $\mu = 3.3$

◉ $\mu = 3.0$

○ $\mu = 3.5$

○ $\mu = 6$

2. What is the advantage of looking at the standard deviation instead of the variance?   `1 point`

○ The standard deviation is less affected by outliers than the variance.

◉ The standard deviation has the same unit as the sample.

○ The standard deviation may be negative.

○ There are no advantages. They mean the same thing.

3. The box plot below shows the distribution of salaries for employees in **three** different company departments.   `1 point`
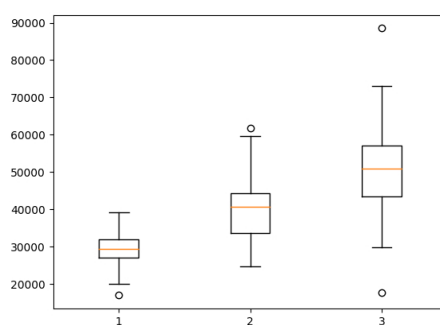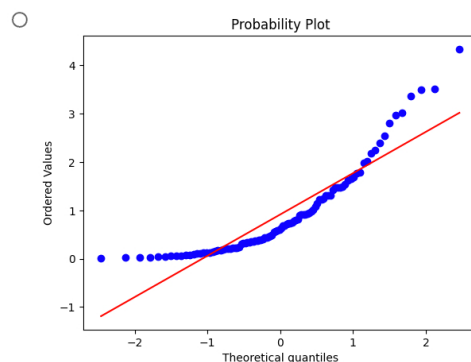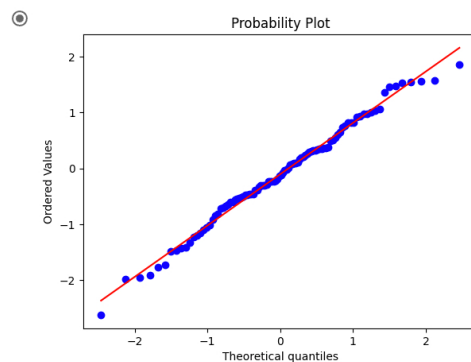

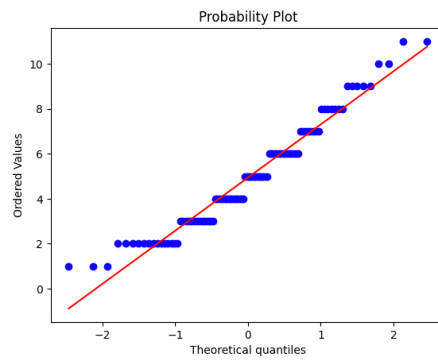Based on the boxplots above, which of the following statements are **true**? **Select all that apply.**

☑ The median salary of department 2 is higher than the median salary of department 1.

☐ The IQR of department 3 is smaller than department 1.

☐ There are no outliers in department 2.

☑ The range of salaries in department 3 is larger than the range of salaries in department 2.

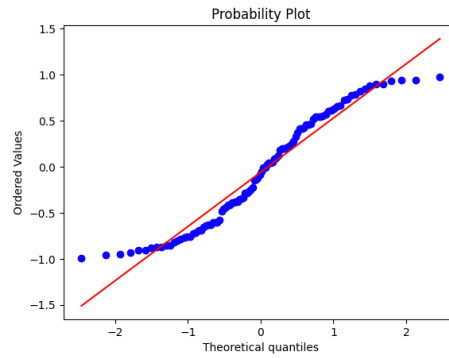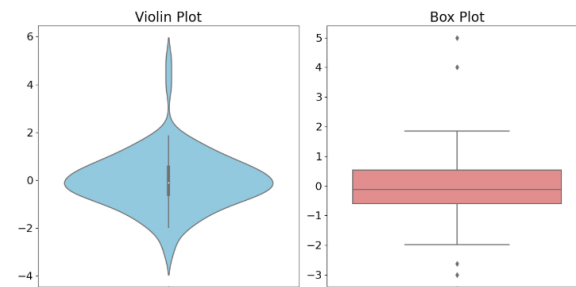4. Which of the following QQ plots represents a set of data that is more likely normally distributed?   `1 point`

◉

○

Probability Plot

5. The violin plot and box plot below are visualizations of the **same dataset**. Based on the violin plot and box plot above, which of the following statements are **true**?   `1 point`

☐ Outliers are visible in the box plot but not in the violin plot.

☑ The dataset has a positive skewness.

☑ The median of the dataset is approximately 0.

☐ The interquartile range (IQR) is smaller in the violin plot compared to the box plot.

☐ The dataset has a bimodal distribution.

6. Suppose that the joint probability distribution of two random variables X and Y is given by the following table: `1 point`

X/Y	1	2	3
1	0.1	0.2	0.3
2	0.2	0.1	0.1

What is the probability that X and Y both take even values?

○ 0.2

◉ 0.1

○ 0.3

○ 0.4

7. Which of the following statements are true regarding marginal and conditional distributions? Select all that apply.   `1 point`

☑ To find the marginal distribution for a variable, probabilities are summed over all variable values, either by adding columns or rows in the joint distribution table.

☑ Marginal distribution summarizes the behavior of one variable at a time by aggregating over the other variable(s).

☑ Conditional distribution involves taking slices of the joint distribution to focus on specific conditions.

8. Suppose that the joint probability distribution of two random variables X and Y is given by the following table: `1 point`

X/Y	1	2
1	0.05	0.15
2	0.1	0.2
3	0.15	0.35

What is the conditional distribution $P(X = 3|Y = 1)$?

○ 0.15

○ 0.25

◉ 0.5

○ 0.333

9. Which of the following statements regarding the correlation coefficient are true? **Select all that apply.**   `1 point`

☐ It is a positive real number.

☐ It can be any real number.

☑ It measures how linearly correlated two variables are.

☑ It is a real number between -1 and 1.

10. Suppose that the joint probability distribution of two random variables X and Y is given by the following table: `1 point`

X/Y	0	1
0	0.2	0.1
1	0.1	0.6

What is the covariance between X and Y?

○ -0.04

◉ 0.11

○ 0.02

○ 0.04