Question 2

> Alice suffers from a thyroid disorder. The amount of antithyroid hormone in her blood is described by the following observations

1.

Let the number of sample be:

$$n = 14$$

Let the data in ascending order be:

$$x_1 = 0.11, \quad x_2 = 1.44, \ ..., \ x_i, \ ..., \ x_n = 10.8, \quad i \in \{1, 2, ..., n\}$$

Then we have the mean:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^{n} x_i = \frac{2\,613}{700} \approx 3.733$$

Let the index of the median (i_{Q_2}), the index of the first quartile (i_{Q_1}) and the index of the third quartile (i_{Q_3}) be:

$$i_{Q_1} = \frac{n+1}{4} \qquad = 3.75 = \frac{1 \times 3 + 3 \times 4}{4}$$

$$i_{Q_2} = \frac{n+1}{2} \qquad = 7.5 = \frac{7+8}{2}$$

$$i_{Q_3} = \frac{3}{4}(n+1) = 11.25 = \frac{3 \times 11 + 1 \times 12}{4}$$

Then we have the median (Q_2), the first quartile (Q_1) and the third quartile (Q_3):

$$Q_1 = x_{i_{Q_1}} = \frac{x_3 + 3x_4}{4} = 2.31$$

$$Q_2 = x_{i_{Q_2}} = \frac{x_7 + x_8}{2} = 3.615$$

$$Q_3 = x_{i_{Q_3}} = \frac{3x_{11} + x_{12}}{4} = 4.437\,5$$

Answer

- $\bar{x} = \frac{2\,613}{700} \approx 3.733$
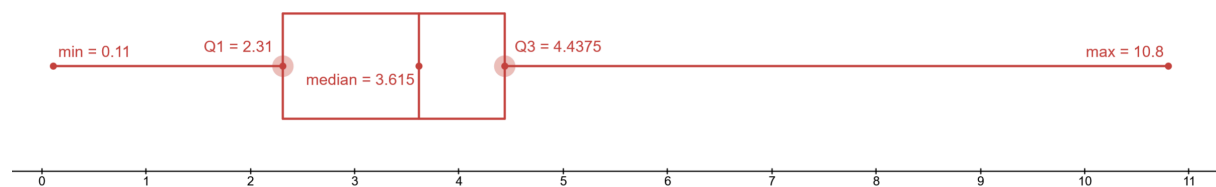- $Q_2 = 3.615$
- $Q_1 = 2.31$
- $Q_3 = 4.437\,5$

2.

Let the minimum ($\min$) and the maximum ($\max$) be:

$$\min = x_1 = 0.11$$
$$\max = x_n = 10.8$$

Then we have the boxplot:

Answer