Durham University
MATH1541 Statistics
Exercise Sheet 14

Kamil Hepak
Tutorial Group 4

Feb 2019

1 Q1

$\bar{x} = \frac{184.7}{17} = 10.8647$
$s_x = \sqrt{\frac{2404.41 - 17 \times 10.8647}{16}} = 4.9849$
For t_{n-1}, ie. t_{16}, $\mu \in \{10.8647 \pm 2.120 \cdot \frac{4.9849}{\sqrt{17}}\}$
$\mu \in \{8.30, 13.43\}$
σ is unknown but n is fairly large - assume underlying data is Normally distributed.

2 Q5

$\bar{x} = \frac{51.6}{6} = 8.6$
$\sigma^2 = 0.4$
Since σ is known but n is small, assuming candle lifetimes are distributed Normally: $\mu \in \{8.6 \pm 2.3263 \cdot \frac{\sqrt{0.4}}{\sqrt{6}}\}$
$\mu \in \{8.00, 9.20\}$

3 Q6

$\bar{x} = 1.90$
$s_x = 0.66$
$\mu \in \{1.90 \pm 2.5758 \cdot \frac{0.66}{\sqrt{18}}\}$
$\mu \in \{1.50, 2.30\}$
σ is unknown but n is fairly large - assume underlying data is Normally distributed. This can be checked with a box plot and normal quantile plot.

4 Q7

$\bar{x} = 22.57$
$s_x = 1.07$
$\mu \in \{22.57 \pm 1.1503 \cdot \frac{1.07}{\sqrt{100}}\}$
$\mu \in \{22.45, 22.69\}$