Durham University
MATH1541 Statistics
Exercise Sheet 14

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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 and n is fairly small - 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

$\bar{x} = 1.90$
$s_x = 0.66$
$\mu \in [1.90 \pm 2.8982 \cdot \frac{0.66}{\sqrt{18}}]$
$\mu \in [1.45, 2.35]$
σ is unknown but n is fairly large - assume underlying data is Normally distributed. This can be checked with a box plot and/or normal quantile plot.

4 Q7

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