Discussion

Section 1

1. \( Y_{1985} = \# \text{ cancer deaths in U.S. in 1985} \)

\( Y_{1970} = \_ \quad 1970 \)

\( Y_{1985} = 462,000 \quad Y_{1970} = 331,000 \)

**Absolute comparison:**

\( Y_{1985} - Y_{1970} = Y_{\text{new}} - Y_{\text{old}} \)

\( = 462,000 - 331,000 \)

\( = +131,000 \)

There were 131,000 more cancer deaths in U.S. in 1985 than in 1970.

**Relative comparison:**

\( \frac{Y_{\text{new}} - Y_{\text{old}}}{Y_{\text{old}}} = \frac{131,000}{331,000} \)

\( \approx 39.6\% \)

\( \approx 40\% \)

331,000

(rough) \( 23\% \)
There was a 40% increase in the number of cancer deaths in U.S. population from 1970 to 1985. 

Another thing: we get better over time at correctly identifying each person's actual reason for dying. Better measure: 5-year survival rate: \( \frac{\text{# people still alive 5 yrs. after diagnosis}}{\text{# patients}} \)
(a) 1. 39 beats in 30 seconds

2. It took 65 sec to get 80 beats

\[
\begin{array}{c|c}
39 \text{ beats} & 60 \text{ sec} = 78 \text{ beats} \\
30 \text{ sec} & 1 \text{ min}
\end{array}
\]

\[
\begin{array}{c|c}
80 \text{ beats} & 60 \text{ sec} = 74 \text{ beats} \\
65 \text{ sec} & 1 \text{ min}
\end{array}
\]

\( \text{Heart rate} = 72 \) bpm

(b) Was more informative because it gives us more data about pulse rate, accuracy, and uncertainty.
true data = measurement process

unbiased

bias: systematic
tendency to over- or under-estimate

intelligent guess = estimate
\[ \frac{131,000}{331,000} = 0.396 \times 10 = 39.6\% = 40\% \]

\[ \frac{39 \text{ beats}}{30 \text{ sec}} \quad 60 \text{ sec} = 78 \text{ beats/min} \]

\[ \frac{80 \text{ beats}}{65 \text{ sec}} \quad 60 \text{ sec} = 73.8 \approx 74 \text{ beats/min} \]

more info (more time)

\[ \text{good} \]

\[ \text{data} = \text{info} \uparrow \quad \text{accuracy} \uparrow \quad \text{uncertainty} \downarrow \]