The points on the third graph are a near fit to a straight line, so given that the graph is of log(secs) against log(digits), the relationship between secs and digits might be of the form

$c + \log(\text{secs}) = k \log(\text{digits})$

$c \times (\text{secs}) = (\text{digits})^k$

iii) Fitting a line to the third graph and finding that the point on the line corresponding to $\log_e(800)$ ($= 6.68$) is ~ ($= \log_e(\text{secs})$), we can estimate the time required for 800 digits accuracy as $e^{8.35} \approx 4230$, which since this is a very rough calculation, we can take secs as ≈ 4000.

(Alternatively, and I am only doing this for my own satisfaction, we can calculate time of precision more accurately by analysing the numbers $\log_e(\text{secs})$ and $\log_e(\text{digits})$ instead of looking at the graph.

Assuming a fit to form of $y = mx + c$

$$\frac{dy}{dx} = \frac{\log(7101) - \log(3.02)}{\log(1000) - \log(40)} \approx \frac{7.76}{3.22} \approx 2.4$$

$y = 2.4x + c$ ($y = \log(\text{secs})$, $x = \log(\text{digits})$)

$\log_e(7101) = 2.4 \log_e(1000) + c \Rightarrow c \approx -7.7$

$\log_e(3.02) = 2.4 \log_e(40) + c \Rightarrow c \approx -7.75$

$y = 2.4x - 7.7$ (for simplicity)

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$\log_e(\text{secs}) = 2.4 \log(800) - 7.7$

$= 2.4 \times 6.68 - 7.7 = 8.33$

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$\text{secs} = e^{8.33} = 4150$ secs)

2) Uniform distribution - every possible outcome of an event is as equally probable as every other possible outcome eg the throw of a dice.

Normal distribution - a bell shaped curve which