2nd Year Assignment 27

1a) 5.76×1.16^t b) a is a constant of proportionality
c) Extrapolation/out of the range of the data

2b) 0.343   c) 0.0345   d) 0.7826

3b) 176.6, 4.021   c) 0.282

4a) The data seems to follow an exponential distribution
b) 0.9735 is close to 1 which gives a strong positive correlation

c) Model is a good fit because there is very strong positive linear correlation between t and $\log_{10} p$

5bi) 0.33   bii) 0.0633   c) T and D are not statistically independent

6a) A critical value is the point (or points) on the scale of the test statistic beyond which we reject the null hypothesis.

b) $H_0 : \rho = 0$, $H_1 : \rho > 0$ Critical value = 0.5494 $0.714 > 0.5494$

There is evidence to reject H_0. There is evidence that there is a positive correlation between the number of vehicles and road traffic accidents.

c) r = −7.0 + 0.02v   d) Road fatalities per 100 000 population

e) This would require extrapolation

7) $\begin{pmatrix} 2 \\ -6 \end{pmatrix}$

8) a) $\begin{pmatrix} 5 \\ -1 \end{pmatrix}$ b) $\begin{pmatrix} 50 \\ -10 \end{pmatrix}$ c) $x = t + 25t^2$, $y = t − 5t^2$ d) 2560 m

9b) $20g(4x − 3)$ c) 0.75   d) $0.75 < x \leqslant 2$
e) Pivot not a point or Alice can't sit exactly on the end or The see-saw might bend.

10a) $x = t \cos \theta$, $y = t \sin \theta − 5t^2$ c) 45°   d) air resistance

11b) 51