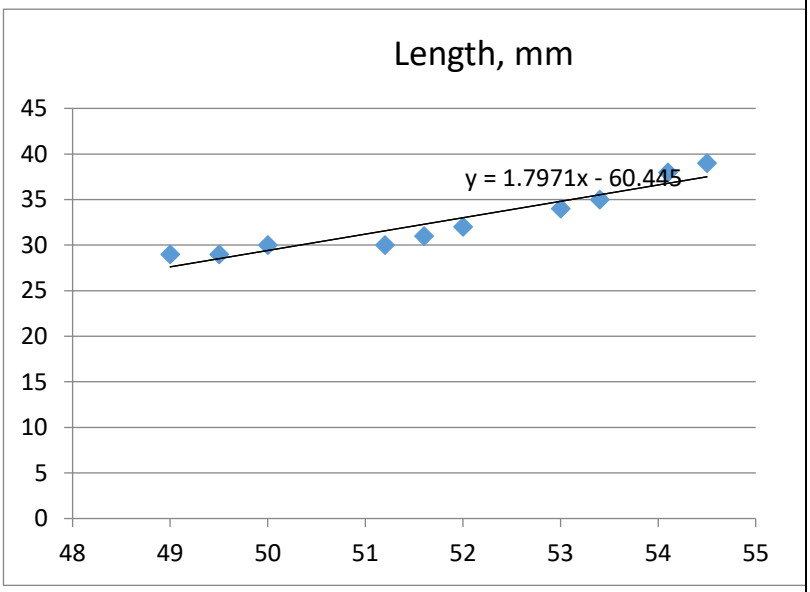
Q9	Model Solution – 50 Marks	Marking Notes
(a)(i)	There is a weak/moderate positive relationship between the weights and lengths of the turtles. The longer the turtle, the heavier it will be.	MS (0, 3, 5) PC: Says it is a weak/moderate relationship or a positive relationship
(ii)	New Correlation Coefficient: 0.947453	MS (0, 4, 10) PC: Has an incorrect Correlation Coefficient within the range 0.94 and 0.955
(iii)		MS (0, 3, 5) PC: Attempt at line of best fit
(iv)	Slope =1.8 Equation is $y = 1.7971x - 60.445$	MS (0, 3, 4, 5) LPC: Work of merit to find slope HPC: Gets a slope within the range of 1.5 -2.1 and working to find the equation of a line
(v)	Solution $y = 1.7971x - 60.445$ In this case $x = 60$ and we must find y $y = 1.7971(60) - 60.445$ $y = 47.381g$	MS (0, 3, 4 ,5) LPC: Identifies 60 as the input needed for the equation HPC: An answer in the range 40g – 55g (excluding the range for full marks) Full Credit: An answer in the range 45g -50g

(b)	H0: The mean weight of the turtles in this area = 31g H1: The mean weight of the turtles in this area ≠ 31g $\bar{x} - 1.96\frac{\sigma}{\sqrt{n}} < \mu < \bar{x} + 1.96\frac{\sigma}{\sqrt{n}}$ $32.7 - 1.96\frac{2}{\sqrt{10}} < \mu < 32.7 - 1.96\frac{2}{\sqrt{10}}$ $31.46g < \mu < 33.93$ Reject H0: The turtles are heavier. OR Or $Z = \frac{x-u}{\frac{\sigma}{\sqrt{n}}} = \frac{32.7-31}{\frac{2}{\sqrt{10}}} = 2.69 \geq 1.96$ The result is significant. Reject H0: The turtles are heavier.	MS (0, 4, 7, 8, 10) LPC: Some attempt at creating a confidence interval or finding a z-score but not completed MPC: Gets a Z-Score but doesn't use $\frac{\sigma}{\sqrt{n}}$ HPC: Creating a confidence interval or found a z-score but a mistake is made or the work is not complete. Conclusion needed for full credit
(c)	H0: The mean length of the turtles in this area = 49mm H1: The mean length of the turtles in this area ≠ 49mm Sample mean = 51.83 $Z = \frac{x-u}{\frac{\sigma}{\sqrt{n}}} = \frac{51.83-49}{\frac{3}{\sqrt{10}}} = 2.98 \geq 1.96$ The result is significant. P – Value $2 \times P(Z > 2.98)$ $2 \times (1 - P(Z < 2.98)$ $2 \times (1 - 0.9986)$ $2 \times (0.0014) = 0.0028 < 0.05$ Therefore the result is significant We reject H0 and accept H1 The mean length of the turtles in this area ≠ 49mm	MS (0, 4, 7 ,8, 10) LPC: Some attempt at finding a z-score but not completed MPC: Gets a Z-Score HPC: Z score found correctly and correct conclusion, but P- Value not found correctly or the sentence "The mean length of the turtles in this area ≠ 49mm" is not stated.