AP Statistics Name_______________________________________
Unit 02 – Bivariate Data
Homework #4

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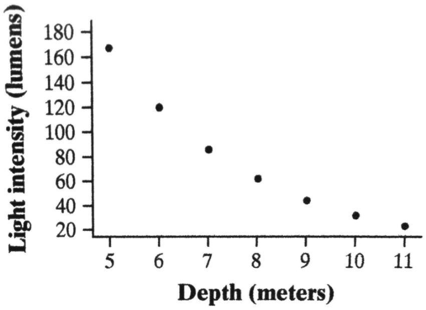
42. **a)** The relationship is strong, negative, and curved with no outliers.



b) Because the scatterplot of ln(intensity) vs. depth is fairly linear, this model is appropriate.

c) $\widehat{ln(y)}$ = 6.789 – 0.333(x), where y is the light intensity in lumens and x is the depth (meters).

d) $\widehat{ln(y)}$ = 6.789 – 0.333(12) = 2.793, so $\hat{y}$ = $e^{2.793}$ lumens.

43. **a)** Exponential, because the scatterplot of log(height) vs. bounce number is more linear.

b) $\widehat{log(y)}$ = 0.45374 – 0.11716 (x), where y = height in feet and x = bounce number.

c) $\widehat{log(y)}$ = 0.45374 – 0.11716 (7) = -0.36638 so $\hat{y}$ = $10^{-0.36638}$ = 0.43 feet.

d) The trend in residual plot suggests that the residual for x = 7 would be positive, meaning that the predicted height will be less than the actual height.

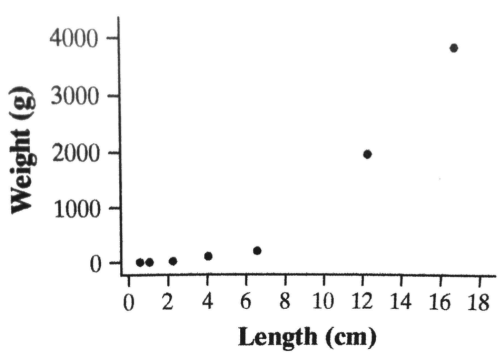
44. **a)** Power, because the scatterplot of log(abundance) vs. log(body mass) is more linear.

b) $\widehat{log(y)}$ = 1.9503 – 1.0481*log(x), where y = abundance (per 10000 kg of prey) and x = body mass (kg).

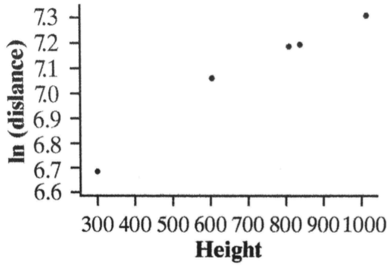
c) $\widehat{log(y)}$ = 1.9503 – 1.0481*log(92.5) = -0.1104, so $\hat{y}$ = $10^{-0.1104}$ = 0.7755 per 10000 kg of prey.

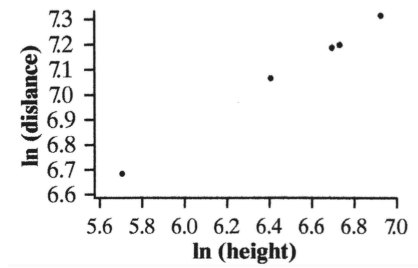
d) Because there are no leftover patterns in the residual plot, the power model is appropriate for these data.

45. **a)** There is a strong, positive, curved relationship between heart weight and length of left ventricle for mammals.



b) Two scatterplots are given below. Because the relationship between ln(weight) and ln(length) is roughly linear, heart weight and length seem to follow a power model.

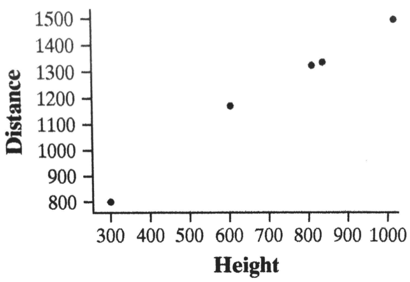




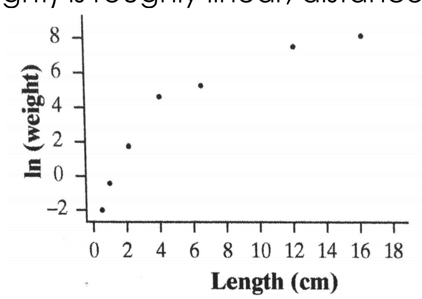
c) $\widehat{ln(y)}$ = -0.314 + 3.1387*ln(x), where y is the weight of the heart and x is the length of the cavity of the left ventricle.

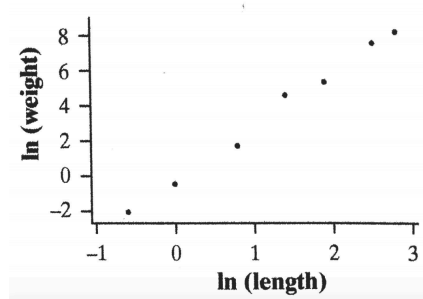
d) $\widehat{ln(y)}$ = -0.314 + 3.1387*ln(6.8) = 5.703, so $\hat{y}$ = $e^{5.703}$ = 299.77 grams.

46. **a)** There is a strong, positive, slightly curved relationship between height and distance.



b) Two scatterplots are given below. Because the relationship between ln(distance) and ln(height) is roughly linear, distance and height seem to follow a power model.





c) The equation is $\widehat{ln(y)}$ = 3.7514 + 0.5152*ln(x), where y is the distance and x is the height.

d) If the ramp height was 700, $\widehat{ln(y)}$ = -0.314 + 3.1387*ln(700) = 7.1265 and $\hat{y}$ = $e^{7.1265}$ =1244.51 units.

47. C

48. E

49. E