

g) The sizes of books, measured for example in categories as follows (heights of books)

$X < 5$ inches	It is recorded only that a book is less than 5 inches, not between 4 and 5 inches, or 3 and 4 inches etc, and similarly for books greater than 10 inches in height.
$5 \leq X < 6$ inches	
$6 \leq X < 7$ inches	
$7 \leq X < 8$ inches	
$8 \leq X < 9$ inches	
$9 \leq X < 10$ inches	
$10 \leq X$ inches	

h) Obviously wrong. The weather forecaster has implied that 0°C on the temperature scale is absolute zero. Any scientist with his salt will tell you that absolute zero is -273.16°C . Twice as warm would actually have been $2(273.16 + 273.16) = 546.32^\circ\text{C}$ or 277.16°C - too hot for sunbathing.

i) $(P_-, P_+) = \left(\hat{p} - z \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}, \hat{p} + z \sqrt{\frac{\hat{p}(1-\hat{p})}{n}} \right)$

$$= \left(0.144 - 1.96 \sqrt{\frac{0.144 \times 0.856}{125}}, 0.144 + 1.96 \sqrt{\frac{0.144 \times 0.856}{125}} \right)$$

$$= (0.0825, 0.2055) \quad \checkmark$$

j) It is expected that there will be 20 heads and 20 tails.

	Observed (O_i)	Expected (E_i)	$O_i - E_i$	$(O_i - E_i)^2 / E_i$
1	3	20	-17	2.45
2	27	20	7	2.45

The test statistic is then $2.45 + 2.45 = 4.9$ to be tested against $\chi^2(1)$ which gives an S.P. of about 0.025. There is some evidence that the coin is not fair.

k) I'd buy a map of bus routes, and ring an information line for prices, for several journeys of different distances on several routes. I would then plot distance travelled (road distance, not as the crow flies) against