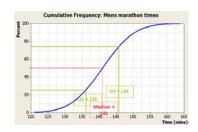


# **KS4 STATISTICS STATEMENTS**

# TEACHERS'NOTES AND SOLUTIONS

### A - TRUE

Although this is an estimate, the median is shown on the graph to the right and the IQR=Q3-Q1=146-136=10

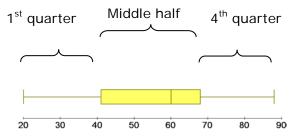


### **B - FALSE**

Although calculating the mean using the information in the table suggests that the mean is 141.3 mins, this is not an exact value but an estimate due to the grouped data and the use of the midpoint to calculate the mean. A different set of groups and thus midpoints may give a different estimate of the mean value.

### C - TRUE

The vertical lines in the box of the box plot represent the 1<sup>st</sup>, 2<sup>nd</sup> (median) and 3<sup>rd</sup> quartiles of the data. This shows the skewness of the distribution.



## D - SOMETIMES TRUE

A histogram differs from a standard bar chart in that the area of the bars represents the frequency and not the height (thus a histogram with bar width '1' would have both height and area of the bars representing the frequency). Since area and not height is of interest, it is possible that the bars are different widths. This does not have to be the case however, thus the statement is *sometimes* true.

## E - FALSE

When calculating probabilities using a tree, the probabilities are multiplied along the branches thus: P(Head then Square number) = P(H) x P(Square No.) =  $\frac{1}{2}$  x  $\frac{1}{3}$  =  $\frac{1}{6}$ .

### F - SOMETIMES TRUE

Each of the probabilities x and y will be a value between 0 and 1. Only if the events are independent and mutually exclusive will the probability of both occurring be the sum of the individual probabilities.

# G - FALSE

Although there is no limit to how much money I possess, it is not true that any value is possible. For example, in British money I cannot possess 10.5p or 10.62p etc. Thus this is a discrete variable.

### H - TRUE

The median is clearly marked by the box plot. The mean is not shown, but since the box plot shows a perfectly symmetrical distribution of values, it can be assumed that the mean must share the same value in this case as the median.



# **KS4 STATISTICS STATEMENTS**

# TEACHERS'NOTES AND SOLUTIONS

### I - FALSE

It is not the mean but the median that is 60g – because the distribution is negatively skewed, the mean is less than the median – less than 60g.

### J - FALSE

The question is ambiguous because the answers are very subjective and so it is difficult to compare answers.

### K - FALSE

The two events in question – the sun shining and it raining are not 'mutually exclusive' i.e. It does not mean that because the sun doesn't shine tomorrow it will rain. The events sunshine tomorrow and no sunshine tomorrow are mutually exclusive thus the probabilities sum to 1 - i.e. P(sun tomorrow) + P(no sun tomorrow) = 1.

### L - TRUE

I got 36 heads out of 60 throws which simplifies to become 3/5 as the estimated experimental probability.

## M - FALSE

One way of thinking about this is to think of making soup. If I make a large vat of soup by putting all the ingredients in a pan but do not stir it and then take a spoonful, I cannot guarantee that my spoonful will taste the same as the next person. If I stir the soup well, I can be reasonably confident that my taster is giving me a good indication of flavour. In neither of these instances would having a larger sample of soup provide a better concept of flavour – in the first because the taster does not represent all of the soup and in the second because the original taster should give a good idea.

### N - FALSE

The correct calculation of the class mean is 63x13=819 (total for the girls) 78x7=546 (total for the boys; 819+546=1365 (class total); 1365/20=68.25% (class average)

The calculation given in the question does not account for the fact that there are more girls in the class than boys.

# O - TRUE

The variables x and y are negatively correlated thus as x increases, y decreases and they are inversely proportional to each other.

### P - TRUE

The 36 combinations when throwing 2 dice are:	Which provide the following totals –
	·
(/ 1) (/ /) (/ 3) (/ 4) (/ 5) (/ 6)	2,3,4,5,6, <mark>7</mark>
$(3.1) \cdot (3.2) \cdot (3.3) \cdot (3.4) \cdot (3.5) \cdot (3.6)$	3,4,5,6, <mark>7</mark> ,8
(4,1),(4,2),(4,3),(4,4),(4,5),(4,6)	<i>4,5,</i> 6, <mark>7</mark> ,8,9
(5,1),(5,2),(5,3),(5,4),(5,5),(5,6)	<i>5,</i> 6, <mark>7</mark> ,8,9,10
(6,1),(6,2),(6,3),(6,4),(6,5),(6,6)	6, <mark>7</mark> ,8,9,10,11
(	<mark>7</mark> ,8,9,10,11,12