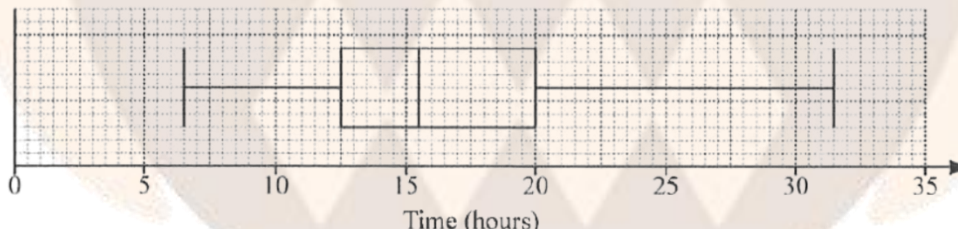


4 ESSENTIAL QUESTIONS TO MASTER

STATISTICS

1	There are 25 students in a class. The table shows the distribution of the heights of these students. <table border="1"> <tr> <th>Height (x cm)</th><th>Frequency</th></tr> <tr> <td>$140 < x \leq 150$</td><td>3</td></tr> <tr> <td>$150 < x \leq 160$</td><td>10</td></tr> <tr> <td>$160 < x \leq 170$</td><td>7</td></tr> <tr> <td>$170 < x \leq 180$</td><td>4</td></tr> <tr> <td>$180 < x \leq 190$</td><td>1</td></tr> </table> (i) Find the interval that contains the median height. (ii) Calculate an estimate of the mean height. (iii) State an estimate of the standard deviation of the heights. (iv) Explain why the mean height and standard deviations in part (ii) and part (iii) are estimates. (v) Five students have transferred out of the class. The estimated mean height of the students in the class is now 163 cm. Explain what this tells you about the mean heights of the five students who transferred out.	Height (x cm)	Frequency	$140 < x \leq 150$	3	$150 < x \leq 160$	10	$160 < x \leq 170$	7	$170 < x \leq 180$	4	$180 < x \leq 190$	1	
Height (x cm)	Frequency													
$140 < x \leq 150$	3													
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$160 < x \leq 170$	7													
$170 < x \leq 180$	4													
$180 < x \leq 190$	1													
2	The box-and-whisker plot gives information about the time, in hours, that 120 adults spent on social media in one week.  (a) State the median time.													

	(b) State the range. (c) There was an error in the collection of data. Every adult spent 2 hours less on social media in one week. Describe the effect this change would have on the box-and-whisker plot.																					
3	(a)The students in a school participate in exactly one CCA each. The table shows information on the type of CCA which students in a class participate in. <table><tr><td></td><td>Clubs & Society</td><td>Sports</td><td>Uniformed Groups</td><td>Total</td></tr><tr><td>Males</td><td>6</td><td></td><td></td><td></td></tr><tr><td>Females</td><td>10</td><td>5</td><td>3</td><td>18</td></tr><tr><td>Total</td><td>16</td><td>12</td><td></td><td>40</td></tr></table> (a) How many males participate in uniformed groups? (b) A pie chart is to be drawn showing the data for the females. Calculate the angle representing females participating in uniformed groups.		Clubs & Society	Sports	Uniformed Groups	Total	Males	6				Females	10	5	3	18	Total	16	12		40	
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4	The cumulative frequency curve shows the distribution of marks scored by 180 students in a Mathematics examination in 2021. The maximum possible mark is 80. (a) $\frac{5}{6}$ of the students scored more than n marks in this exam. Find n. (b) To obtain the final mark of each student, the teacher divided the mark on the cumulative frequency curve by 2 and added the result to 15. Find the number of students who had the final mark of 37 or less. (c) The marks scored by another group of 180 students in the same mathematics examination has the same median but a larger standard deviation. Describe how the cumulative frequency curve for the new group of students will differ from that of the first group of students.																					

Answer Key:

1	(i) $150 < x \leq 160$ Here is the text from your image, reproduced verbatim: (ii) Estimate of Mean Height $= \frac{3(145) + 10(155) + 7(165) + 4(175) + 1(185)}{25}$ $= 161 \text{ cm}$	
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	(iii) $10.19803903 = 10.2$ (to 3 s.f.) (iv) We do not know the actual heights of the students. (v) The mean height of the five students is less than 161 cm.	
2	(a) 15.5hrs (b) Range = $31.5 - 6.5 = 25$ (c) The whole box-and-whisker plot will move to the left by 4 square units.	
3	(a) 9 (b) Angle = $\frac{3}{18} \times 360 = 60$	
4	(a) $n=36$ (b) 90 students (c) Cumulative frequency curve will have a wider spread/a gentler gradient.	