

1 The table below shows the times spent waiting on the phone w, to the nearest minute, for 12 patients who phoned their doctor's surgery.

Calculate the me												
Carearate the file	an wai	t time.										(1)
Calculate the var	riance	of the v	vait tii	nes and	d state	the uni	ts.					(2)
Calculate the sta	ndard	deviati	on of t	he wai	t times	and sta	ate the	units.				(2)
Show clearly that	t all of	the wa	ait tim	es are v	within	three st	andard	l devia	tions o	f the m	iean.	(2)
						(T	'otal fo	or Que	stion 1	is 7 m	narks)	
e data below show	vs the r	number	of po	ints sco	ored by	v a bask	tetball	team p	, in the	e first h	alf of	a seasoi
67	71	7	5	79	85	85	8	8	88	91		
Calculate the me	an nur	nber of	f point	s score	d.							(1)
Calculate the sta	ndard	deviati	on of t	he poir	nts scor	red.						(1)
			-				lf of th	e seas	on.			
$\sum q = 774$	$\sum q^2$	= 66 8	336									
	an and	standa	rd dev	iation o	of the p	oints s	econd	in the	second	half		(3)
	_				_		-					(2)
						(T	'otal fo	or Que	stion 2	2 is 7 m	narks)	
	Calculate the state Show clearly that e data below show 67 Calculate the met Calculate the state basketball team e points for these $\sum q = 774$ Calculate the meta of the season. Use your answer	Calculate the standard of Show clearly that all of e data below shows the r 67 71 Calculate the mean nur Calculate the standard of e basketball team played points for these games, $\Sigma q = 774$ Σq^2 Calculate the mean and of the season. Use your answers to par	Calculate the standard deviation Show clearly that all of the way e data below shows the number 67 71 7 Calculate the mean number of Calculate the standard deviation e basketball team played a 9 me e points for these games, q , are $\sum q = 774$ $\sum q^2 = 66$ & Calculate the mean and standard the season. Use your answers to parts (a),	Calculate the standard deviation of the Show clearly that all of the wait times and the standard deviation of the standard deviation of the standard deviation of the season. Calculate the mean number of points for these games, q , are summing $\sum q = 774$ $\sum q^2 = 66836$ Calculate the mean and standard deviation of the season. Use your answers to parts (a), (b) and	Calculate the standard deviation of the wai Show clearly that all of the wait times are verticed at a below shows the number of points score 67 71 75 79 Calculate the mean number of points score Calculate the standard deviation of the points basketball team played a 9 more games in points for these games, q , are summarised $\sum q = 774 \qquad \sum q^2 = 66\ 836$ Calculate the mean and standard deviation of the season. Use your answers to parts (a), (b) and (c) to	Calculate the standard deviation of the wait times Show clearly that all of the wait times are within the e data below shows the number of points scored by 67 71 75 79 85 Calculate the mean number of points scored. Calculate the standard deviation of the points score e basketball team played a 9 more games in the sec e points for these games, q , are summarised below. $\sum q = 774 \qquad \sum q^2 = 66\ 836$ Calculate the mean and standard deviation of the points the season. Use your answers to parts (a), (b) and (c) to compare	Calculate the standard deviation of the wait times and state Show clearly that all of the wait times are within three state (T) e data below shows the number of points scored by a bask 67 71 75 79 85 $85Calculate the mean number of points scored.Calculate the standard deviation of the points scored.e basketball team played a 9 more games in the second hase points for these games, q, are summarised below.\sum q = 774 \sum q^2 = 66836Calculate the mean and standard deviation of the points sof the season.Use your answers to parts (a), (b) and (c) to compare thethe first half of the season to the points scored in the second$	Show clearly that all of the wait times are within three standard (Total for a data below shows the number of points scored by a basketball 67 71 75 79 85 85 8 Calculate the mean number of points scored. Calculate the standard deviation of the points scored. Calculate the standard deviation of the points scored. $\sum q = 774$ $\sum q^2 = 66836$ Calculate the mean and standard deviation of the points second below.	Calculate the standard deviation of the wait times and state the units. Show clearly that all of the wait times are within three standard devia (Total for Que e data below shows the number of points scored by a basketball team p 67 71 75 79 85 85 88 Calculate the mean number of points scored. Calculate the standard deviation of the points scored. e basketball team played a 9 more games in the second half of the sease p points for these games, q , are summarised below. $\sum q = 774$ $\sum q^2 = 66 836$ Calculate the mean and standard deviation of the points second in the soft the season. Use your answers to parts (a), (b) and (c) to compare the points scored the first half of the season to the points scored in the second half of the season to the points scored in the second half of the season below.	Calculate the standard deviation of the wait times and state the units. Show clearly that all of the wait times are within three standard deviations o (Total for Question 1) e data below shows the number of points scored by a basketball team <i>p</i> , in the 67 71 75 79 85 85 88 88 Calculate the mean number of points scored. Calculate the standard deviation of the points scored. e basketball team played a 9 more games in the second half of the season. e points for these games, <i>q</i> , are summarised below. $\sum q = 774$ $\sum q^2 = 66 836$ Calculate the mean and standard deviation of the points second in the second of the season. Use your answers to parts (a), (b) and (c) to compare the points scored by the the first half of the season to the points scored in the second half of the season	Calculate the standard deviation of the wait times and state the units. Show clearly that all of the wait times are within three standard deviations of the m (Total for Question 1 is 7 m e data below shows the number of points scored by a basketball team <i>p</i> , in the first h 67 71 75 79 85 85 88 88 91 Calculate the mean number of points scored. Calculate the standard deviation of the points scored. e basketball team played a 9 more games in the second half of the season. e points for these games, <i>q</i> , are summarised below. $\sum q = 774 \qquad \sum q^2 = 66836$ Calculate the mean and standard deviation of the points second in the second half of the season. Use your answers to parts (a), (b) and (c) to compare the points scored by the team is the first half of the season to the points scored in the second half of the season.	Calculate the standard deviation of the wait times and state the units. Show clearly that all of the wait times are within three standard deviations of the mean. (Total for Question 1 is 7 marks) e data below shows the number of points scored by a basketball team <i>p</i> , in the first half of 67 71 75 79 85 85 88 88 91 Calculate the mean number of points scored. Calculate the standard deviation of the points scored. calculate the standard deviation of the points scored. basketball team played a 9 more games in the second half of the season. points for these games, <i>q</i> , are summarised below. $\sum q = 774$ $\sum q^2 = 66 836$ Calculate the mean and standard deviation of the points second in the second half of the season. Use your answers to parts (a), (b) and (c) to compare the points scored by the team in

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3 A sample of 8 students from Year 7 and 8 students from Year 10 were taken. The heights of the Year 7 students (x) and Year 10 students (y), in cm, are summarised below. $\sum x = 1228$ $\sum x^2 = 189\ 060$ $\sum y = 1368$ $\sum y^2 = 235032$ (a) Calculate the mean and standard deviation of the heights of Year 7 students. (3) (b) Calculate the mean and standard deviation of the heights of Year 10 students. (3) (c) Compare the heights of Year 7 and Year 10 students. (2) (d) Calculate the mean and standard deviation of the heights of all 16 students. (3) (Total for Question 3 is 11 marks) 4 8 different teams were timed to escape from an escape room. Their times to escape *x*, to the nearest minute, are summarised below. $\sum x = 434$ $\sum (x - \bar{x})^2 = 187.5$ (a) Calculate the mean time taken to escape. (1)(b) Calculate the standard deviation of the times taken to escape. (2)Another team is timed to escape from an escape room. This extra team escapes in 55 minutes. The mean and standard deviation are recalculated for all 9 times. (c) Without further calculation, state what effect, if any, including the extra time of 55 minutes will have on (i) the mean (ii) the standard deviation (2)(Total for Question 4 is 5 marks) 2

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5 Martin wants to research the number of bedrooms and bathrooms there were in properties in his town.

Martin goes into town and asks the people he meets their address and how many bedrooms and bathrooms are in their home. [Side note don't tell strangers your address]. He continues until he has a sample of size 40 ensuring each address is different.

(a) Write down the name of this sampling technique.

The tables below summarise the number of bedrooms (x) and bathrooms (y) for the 40 properties.

		-	-	-		-			
	Number of Bedrooms (x)	1	2	3	4	5			
	Frequency (f)	1	6	22	9	2			
					1	-			
	Number of Bathrooms (y)	1	2	3					
	Frequency (f)	28	9	3					
(c)	Calculate the mean number of bed Calculate the standard deviation for Calculate the mean number of bath	or the numb	per of bedro	ooms.					
• •	(e) Calculate the standard deviation for the number of bathrooms.								
(f)	Are the number of bedrooms or nu	mber of ba	throoms m	ore varied	?				
	Give a reason for your answer.		(Total for (Question 5	is 6 mark	s)		

6 A headteacher wants to know which day of the week is the worst for student lateness to school. To test this, they record the number of late students each weekday for 4 weeks.

The headteacher works out the mean number and standard deviation of the number of late students for each weekday.

The table below summarises the headteacher's calculations.

Day	Mon	Tues	Weds	Thurs	Fri
Mean	12	12.5	12.6	10.25	23
Standard Deviation	0	1.66	3.04	-2.28	2.55

As maths teacher checks the data and realises that two of the values were calculated incorrectly.

(a) State which two values were calculated incorrectly. Give reasons for your answers. (2)

The headteacher also wants to know about the number of detentions being set.

The number of detentions received in a one-month period for 30 Year 10 students (x) and 30 Year 11 students (y) are summarised below.

 $\sum x = 126$ $\sum x^2 = 828$ $\sum y = 93$ $\sum (y - \bar{y})^2 = 392.7$

(b) By working out the standard deviation determine which of the year groups had more variation in their number of detentions.

(5)

(Total for Question 6 is 7 marks)

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(1)



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7 A lottery draws 6 winning numbers.

Players win a prize if their ticket matches 2 or more of the winning numbers.

The prize breakdown for a lottery draw is shown below.

Numbers Matched	Prize Value (£)	Number of Prizes
6	11 449 068	1
5	1750	186
4	140	12 142
3	30	222 468
2	2	1 678 011

(a) Calculate the mean prize value to the nearest pound. (1)

(b) Calculate the percentage of the prizes awarded that were below the mean prize value. (2)

- (c) Calculate the standard deviation of the prize values to the nearest pound.
- (d) State a reason why the standard deviation may not be a suitable measure of spread to describe these data.

The prize values $(\pounds x)$ for a different lottery draw are summarised below.

 $n = 1\ 800\ 000$ $\sum x = 22\ 752\ 692$ $S_{xx} = 96\ 868\ 911\ 115\ 690$

(e) Calculate, to the nearest pound, the mean and standard deviation of the prize values for this lottery draw.

(Total for Question 7 is 8 marks)

(1)

(1)

(3)



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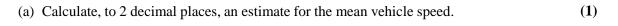
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8 The speeds *S*, to the nearest mph, of 40 cars travelling through a village are shown below.

Vehicle speed (S mph)	Frequency (f)	Midpoint (x mph)
$0 \le S < 10$	1	5
$10 \le S < 20$	3	15
$20 \le S < 30$	31	25
$30 \le S < 40$	4	35
$40 \le S < 50$	1	45

You may use $\sum fx = 1010$ and $\sum fx^2 = 27\ 000$



(b) Calculate, to 2 decimal places, an estimate for the standard deviation of the vehicle speeds. (2)

(c) Explain why your answers to parts (a) and (b) are only estimates.

It is found that one of the vehicle speeds was incorrectly recorded as 2 mph but was in fact 25 mph.

(d) Without calculate a new estimates state what effect, if any, using the correct speed will have on

(i) your estimate for the mean

(ii) your estimate for the standard deviation

Give reasons for your answers.

(2)

(1)

(Total for Question 8 is 6 marks)

9 At a jigsaw puzzle competition entrants are timed to complete a jigsaw puzzle. There are 50 entrants, some of which are professionals, and the rest are amateurs.

The times of the amateurs (x) and the professionals (y), to the nearest minute are summarised below.

 $\sum (x - \overline{x})^2 = 5082 \qquad \overline{y} = 43 \qquad \sigma_x = 11 \qquad \sigma_y = 3$

The total time for all 50 entrants was 3578 minutes.

Work out the standard deviation of the times all 50 of the entrants.

(6)

(Total for Question 9 is 6 marks)

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