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Statistics

Unit 1
Higher Tier



GST12

[GST12]

THURSDAY 21 JUNE, MORNING

TIME

2 hours.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

Write your answers in the spaces provided in this question paper.

Answer **all thirteen** questions.

Any working should be clearly shown in the spaces provided since marks may be awarded for partially correct solutions.

You **may** use a calculator for this paper.

INFORMATION FOR CANDIDATES

The total mark for this paper is 100.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

You should have a calculator, ruler, compasses and protractor.

The formula sheet is on page 2.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
Total Marks	

HIGHER TIER FORMULAE SHEET

$$\text{Standard deviation} = \sqrt{\frac{\sum fx^2}{n} - \left(\frac{\sum fx}{n}\right)^2}$$

Spearman's Rank Correlation Coefficient

$$r_s = 1 - \left[\frac{6 \sum d^2}{n(n^2 - 1)} \right]$$

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(Questions start overleaf)

Answer **all** questions

- 1** The table below shows the number of each type of traffic offence recorded by the police in Northern Ireland each month in 2016

Offence	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Breach of signs and signals	46	37	30	30	39	14	13	29	26	43	41	39	387
Careless driving	486	551	527	405	386	250	94	79	95	129	140	103	3245
Construction and use	411	357	315	206	165	174	98	78	70	106	99	66	2145
Dangerous driving	7	25	30	16	6	7	7	2	0	4	1	4	109
Lighting	58	56	60	29	19	20	47	26	26	52	40	49	482
Miscellaneous	68	78	105	82	51	23	13	14	10	12	14	14	484
Parking	145	87	122	57	57	45	35	45	62	152	181	70	1058
Pedal cyclists	2	0	1	2	4	3	1	0	1	2	1	1	18
Pedestrian	12	8	9	3	5	7	2	1	3	5	3	4	62
Seatbelt	54	121	111	68	88	98	84	50	75	83	67	67	966
Speeding	505	680	569	498	472	492	524	411	386	513	462	326	5838
Tachograph	0	1	0	0	0	0	1	0	0	2	1	1	6
Using a mobile phone	423	467	537	468	403	428	396	352	413	379	465	275	5006
No insurance	76	81	98	60	58	69	84	72	56	74	76	67	871
No vehicle test certificate	50	64	68	54	22	36	71	38	41	44	56	67	611
No driving licence	6	9	5	4	1	2	0	0	0	0	0	0	27
TOTAL	2349	2622	2587	1982	1776	1668	1470	1197	1264	1600	1647	1153	21 315

© PSNI motoring-offences-statistics 2016 report <http://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

(a) Write down the total number of traffic offences committed in 2016

Answer _____ [1]

(b) How many Seatbelt or Speeding offences were committed in August?

Answer _____ [1]

(c) A newspaper printed the following headline:

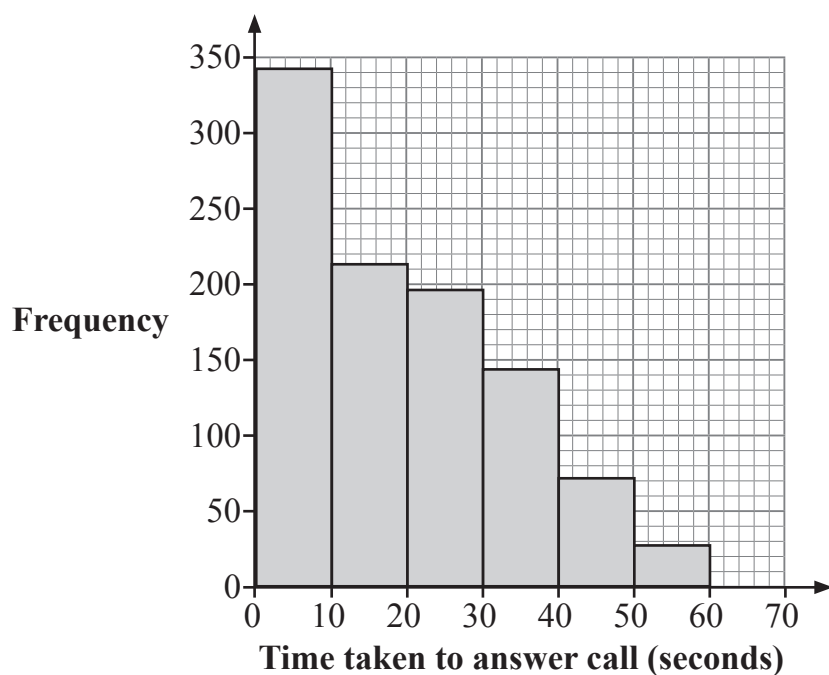
“21 000 bad drivers in Northern Ireland”

Give one reason why this headline could be misleading.

_____ [1]

Examiner Only	
Marks	Remark

A histogram showing the distribution of the times taken to answer the calls is shown below.



- (d) (i)** Do you think that this data could be modelled by a normal distribution?

Tick the correct box.

Yes ☐

No

[1]

- (ii)** Explain your answer.

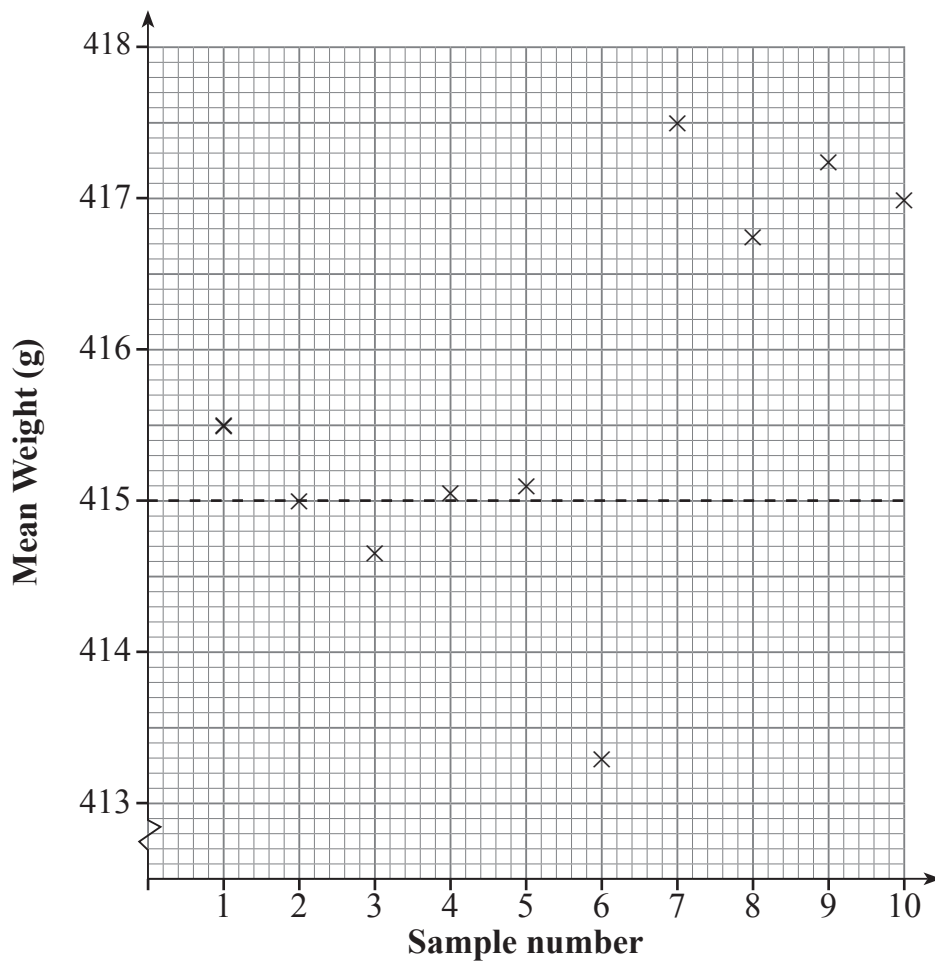
[1]

(c) One of the passengers travelling on holiday is chosen at random.

What is the probability that the passenger is male?

Answer _____ [2]

Examiner Only	
Marks	Remark



- (d) During the shift, the production manager went home sick so the control chart went unchecked.

Explain, with reasons, how the production manager would have responded to the chart if he had been at work.

[4]

Examiner Only	
Marks	Remark

- (b) Victor says that the table indicates that the most expensive apartment in the city cost £155 000

Give two reasons why Victor may not be correct.

Reason 1

 [1]

Reason 2

 [1]

Examiner Only	
Marks	Remark

- 10** The table below shows the number of complaints received by a company each quarter over a three-year period.

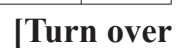
Year	Quarter	No. of complaints	4-point moving averages
2012	Q1	79	
	Q2	102	
	Q3	120	103
	Q4	111	105
			106
2013	Q1	87	
	Q2	106	108.5
	Q3	130	109.5
	Q4	115	112
2014	Q1	97	
	Q2	120	
	Q3	134	
	Q4	125	

- (a) Explain briefly why **4-point** moving averages are used for this data.

- (b)** Complete the table above. [3]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark



Examiner Only	
Marks	Remark

[2]

[2]

Examiner Only	
Marks	Remark

Dancer	Judge 1	Judge 2		
A	1	2		
B	2	1		
C	3	3		
D	4	4		
E	5	6		
F	6	5		
G	7	7		
H	8	8		

- (d)** Calculate Spearman's rank correlation coefficient for this data, giving your answer correct to three decimal places.

Answer _____ [3]

- (e) Anna thinks one of the judges is not judging consistently.

Using your result from **(d)**, comment on Anna's claim.

[2]

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(Questions continue overleaf)

- 12** The table below shows the price of a jar of coffee on 1st January over four years.

Year	2014	2015	2016	2017
Price	£3.09		£3.22	£3.17
Chain base index number	100	101.0	103.2	

- (a)** Calculate the price of a jar of coffee on 1st January 2015

Answer £ _____ [2]

- (b)** Calculate the chain base index number for 2017

Answer _____ [3]

Examiner Only	
Marks	Remarks

- (c) Explain the meaning of the value of the chain base index number for 2017 which you calculated in part (b).

[2]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

15% management

Production	Administration	Management
106	103	107

Calculate the wages bill for the **production** department in 2016

Answer _____ [4]

- (e) Calculate the weighted index number for the company's total wages bill for 2016

Examiner Only	
Marks	Remark

Answer _____ [4]

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