

# GCSE Statistics

Revision & Extended Answers

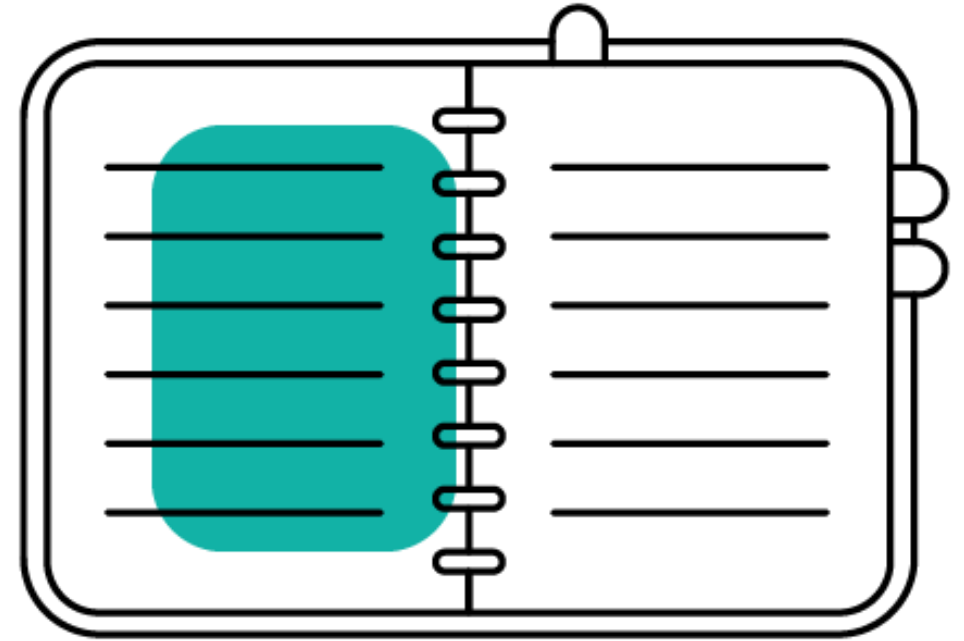
Melanie Muldowney



# Agenda

In this session we are going to look at:

- Ideas for revision ... Practice? Practise?
- Extended answers – Why?
- Key ideas / Issues
- Share some ideas / resources to help in the classroom



# The Final Stretch



# Know your way around the skills maps

To help:

- Prepare students
- In the classroom

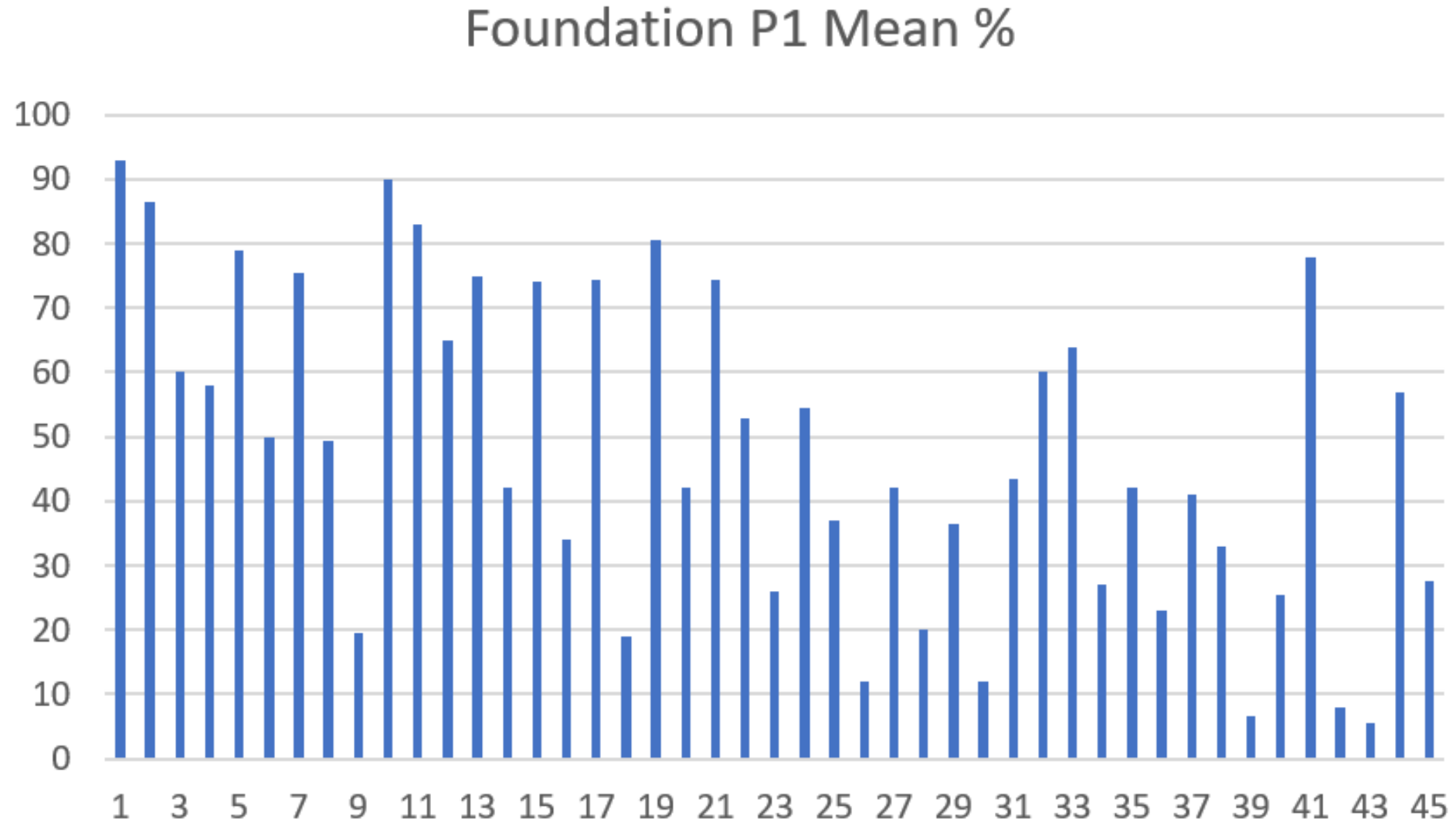
\*there are other ways to look at it!



# F P1

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Q	Part	Position in paper	Performance	Difference	Skill tested	Mean score	Max score	Mean %	5	4	3	2	1	U	ALL
Q01	a	1	1	0	Pictogram - Completing	0.93	1	93	0.98	0.98	0.97	0.92	0.81	0.51	0.93
Q01	b	2	3	-1	Pictogram - Using	1.73	2	87	1.92	1.87	1.82	1.68	1.35	0.64	1.73
Q01	c	3	15	-12	Pictogram - Comparing	1.20	2	60	1.47	1.36	1.26	1.08	0.75	0.27	1.20
Q01	d	4	17	-13	Importance of reliability and validity	1.16	2	58	1.67	1.47	1.18	0.82	0.43	0.11	1.16
Q02	ai	5	6	-1	Bar charts - completing	0.79	1	79	0.97	0.94	0.85	0.69	0.38	0.07	0.79
Q02	aii	6	21	-15	Bar charts - completing	0.50	1	50	0.78	0.65	0.48	0.33	0.15	0.02	0.50
Q02	b	7	8	-1	Bar charts - completing	1.51	2	76	1.88	1.77	1.62	1.36	0.80	0.16	1.51
Q02	c	8	22	-14	Bar charts - Comparing	0.99	2	50	1.58	1.25	0.94	0.67	0.34	0.05	0.99
Q02	d	9	39	-30	Justify the appropriateness	0.39	2	20	0.85	0.49	0.29	0.16	0.05	0.01	0.39
Q03	ai	10	2	8	Tabulation - Reading	0.90	1	90	0.97	0.94	0.92	0.89	0.80	0.42	0.90
Q03	aii	11	4	7	Tabulation - Reading	0.83	1	83	0.93	0.90	0.86	0.80	0.65	0.26	0.83
Q03	b	12	13	-1	Tabulation - Interpreting	0.65	1	65	0.84	0.75	0.65	0.56	0.39	0.10	0.65
Q03	c	13	9	4	Tabulation - Comparing	1.50	2	75	1.77	1.70	1.58	1.39	1.01	0.28	1.50
Q03	d	14	24	-10	Time series	0.84	2	42	1.35	1.08	0.84	0.52	0.16	0.01	0.84
Q03	e	15	12	3	Identify trends in data	0.74	1	74	0.90	0.86	0.80	0.67	0.39	0.09	0.74
Q04	a	16	31	-15	Definitions of different types of data	0.34	1	34	0.53	0.39	0.31	0.24	0.20	0.10	0.34
Q04	b	17	10	7	Calculate median	1.49	2	75	1.84	1.74	1.59	1.35	0.80	0.13	1.49
Q04	c	18	40	-22	Justify the rationale for using median	0.19	1	19	0.32	0.21	0.16	0.14	0.09	0.03	0.19
Q04	d	19	5	14	Calculate range	1.61	2	81	1.97	1.93	1.80	1.40	0.73	0.09	1.61
Q04	e	20	25	-5	Compare data sets using range and median	1.68	4	42	3.17	2.32	1.52	0.70	0.14	0.01	1.68
Q05	a	21	11	10	Sample space diagrams - completing	1.49	2	75	1.92	1.80	1.57	1.24	0.70	0.22	1.49
Q05	bi	22	20	2	Sample space diagrams - using	0.53	1	53	0.89	0.73	0.51	0.28	0.09	0.01	0.53
Q05	bii	23	35	-12	Sample space diagrams - using	0.26	1	26	0.61	0.34	0.17	0.08	0.03	0.00	0.26
Q05	c	24	19	5	Experimental v theoretical values	1.09	2	55	1.70	1.40	1.11	0.71	0.24	0.04	1.09
Q06	a	25	29	-4	Hypothesis testing	0.37	1	37	0.69	0.50	0.33	0.16	0.07	0.01	0.37
Q06	b	26	41	-15	Systematic sampling	0.12	1	12	0.31	0.17	0.07	0.03	0.00	0.00	0.12
Q06	ci	27	26	1	Systematic sampling	0.42	1	42	0.69	0.56	0.39	0.23	0.09	0.01	0.42
Q06	cii	28	38	-10	Systematic sampling	0.40	2	20	1.02	0.58	0.22	0.05	0.02	0.00	0.40
Q06	d	29	30	-1	Questionnaires	0.73	2	37	1.05	0.89	0.76	0.57	0.28	0.06	0.73
Q06	ei	30	42	-12	Planning data collection	0.12	1	12	0.29	0.15	0.07	0.03	0.01	0.00	0.12
Q06	eii	31	23	8	Planning data collection	0.87	2	44	1.39	1.13	0.84	0.56	0.25	0.03	0.87
Q06	f	32	16	16	Reliability and validity	0.60	1	60	0.80	0.73	0.64	0.48	0.25	0.04	0.60
Q07	a	33	14	19	Pie chart - comparing	1.28	2	64	1.66	1.55	1.39	1.05	0.52	0.10	1.28
Q07	b	34	34	0	Pie chart	0.54	2	27	1.29	0.76	0.33	0.10	0.02	0.00	0.54
Q08	a	35	27	8	Tabulation - Reading	0.84	2	42	1.56	1.19	0.74	0.32	0.07	0.00	0.84
Q08	bi	36	37	-1	Arithmetic mean	0.69	3	23	1.73	0.91	0.43	0.16	0.04	0.00	0.69
Q08	bii	37	28	9	Arithmetic mean	0.41	1	41	0.77	0.56	0.36	0.17	0.05	0.01	0.41
Q08	biii	38	32	6	Arithmetic mean	0.33	1	33	0.68	0.46	0.27	0.12	0.04	0.01	0.33
Q08	c	39	44	-5	Select and justify appropriate diagrams	0.13	2	7	0.40	0.15	0.05	0.02	0.01	0.00	0.13
Q09		40	36	4	Population pyramid	1.27	5	25	2.65	1.68	1.05	0.48	0.11	0.00	1.27
Q10	a	41	7	34	Histograms- using	1.56	2	78	1.94	1.88	1.74	1.34	0.66	0.14	1.56
Q10	b	42	43	-1	Histograms- using	0.16	2	8	0.46	0.17	0.08	0.06	0.03	0.01	0.16
Q10	c	43	45	-2	Skewness	0.11	2	6	0.29	0.14	0.08	0.03	0.01	0.00	0.11
Q11	a	44	18	26	Tree diagrams	1.14	2	57	1.82	1.54	1.15	0.64	0.16	0.02	1.14
Q11	b	45	33	12	Formal notation for independent events	1.10	4	28	3.10	1.47	0.50	0.16	0.02	0.01	1.10
						36.53	80	46	56.40	45.04	35.29	25.44	14.19	4.08	36.53

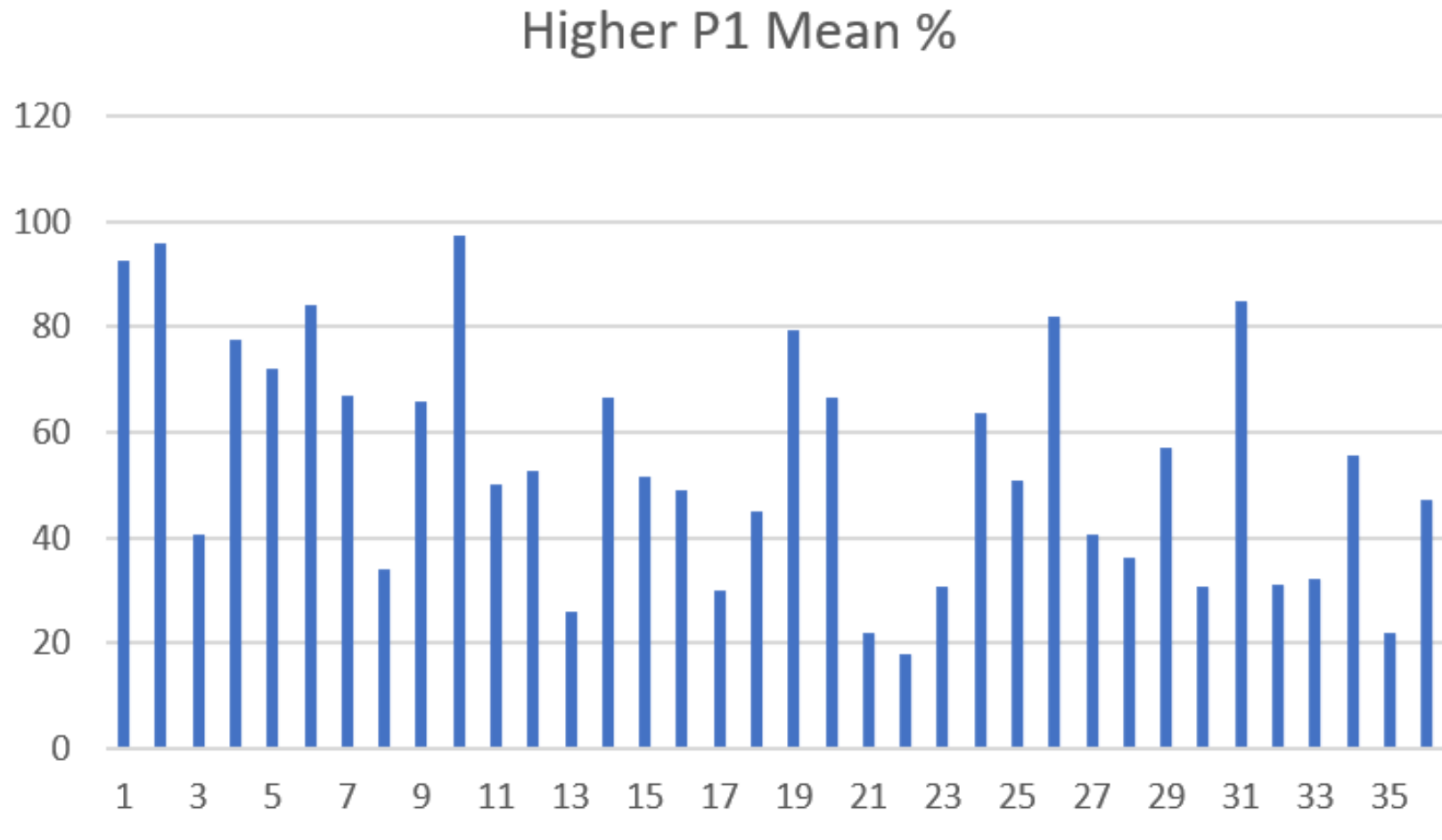
# Useful for students to see F P1



# H P1

Q	Part	Position in paper	Performance	Difference	Skill tested	Mean score	Max score	Mean %	9	8	7	6	5	4	3	U	ALL
Q01	ai	1	3	-2	Rates of change over time - using	1.85	2	93	1.98	1.96	1.93	1.89	1.81	1.63	1.28	0.97	1.85
Q01	aii	2	2	0	Rates of change over time - using	0.96	1	96	0.99	0.98	0.98	0.97	0.96	0.90	0.85	0.72	0.96
Q01	b	3	25	-22	Rates of change over time - using	0.81	2	41	1.08	0.87	0.83	0.77	0.77	0.68	0.65	0.42	0.81
Q02	a	4	8	-4	Tabulation - Reading	1.55	2	78	1.95	1.86	1.74	1.59	1.37	1.07	0.75	0.38	1.55
Q02	bi	5	9	-4	Arithmetic mean	2.16	3	72	2.90	2.79	2.61	2.27	1.77	1.07	0.43	0.19	2.16
Q02	bii	6	5	1	Arithmetic mean	0.84	1	84	0.99	0.98	0.94	0.90	0.76	0.58	0.39	0.13	0.84
Q02	biii	7	10	-3	Arithmetic mean	0.67	1	67	0.88	0.81	0.76	0.70	0.59	0.44	0.25	0.02	0.67
Q02	c	8	27	-19	Select and justify appropriate diagrams	0.68	2	34	1.27	1.03	0.82	0.67	0.43	0.22	0.09	0.02	0.68
Q03		9	13	-4	Population pyramid	3.30	5	66	4.69	4.31	3.84	3.33	2.61	1.91	1.24	0.48	3.30
Q04	a	10	1	9	Histograms- using	1.95	2	98	1.99	1.97	1.96	1.95	1.95	1.92	1.89	1.58	1.95
Q04	b	11	20	-9	Histograms - using	1.00	2	50	1.80	1.61	1.31	0.96	0.55	0.25	0.16	0.06	1.00
Q04	c	12	17	-5	Skewness	1.05	2	53	1.79	1.57	1.32	1.05	0.65	0.36	0.20	0.05	1.05
Q05	ai	13	33	-20	Reasons for employing judgement sampling	0.26	1	26	0.65	0.45	0.32	0.21	0.11	0.06	0.03	0.00	0.26
Q05	aii	14	12	2	Reliability and validity	1.33	2	67	1.76	1.68	1.51	1.35	1.16	0.84	0.48	0.20	1.33
Q05	b	15	18	-3	Questionnaires	1.03	2	52	1.55	1.42	1.22	0.97	0.78	0.55	0.31	0.16	1.03
Q05	c	16	21	-5	Problems with collected data	0.98	2	49	1.61	1.16	1.06	0.99	0.86	0.74	0.51	0.23	0.98
Q05	d	17	32	-15	Systematic sampling	0.90	3	30	1.96	1.46	1.11	0.80	0.49	0.26	0.10	0.02	0.90
Q05	e	18	23	-5	Interviews v questionnaires	0.45	1	45	0.74	0.62	0.49	0.42	0.36	0.29	0.19	0.10	0.45
Q06	a	19	7	12	Identify trends in data	1.59	2	80	1.96	1.92	1.84	1.67	1.38	1.03	0.65	0.37	1.59
Q06	b	20	11	9	Interpret seasonal trends in context	2.00	3	67	2.66	2.46	2.28	2.04	1.78	1.26	0.51	0.08	2.00
Q06	ci	21	34	-13	Interpret seasonal trends in context	0.44	2	22	1.63	1.12	0.47	0.16	0.03	0.01	0.00	0.00	0.44
Q06	cii	22	36	-14	Interpret seasonal trends in context	0.18	1	18	0.73	0.46	0.17	0.05	0.01	0.00	0.00	0.00	0.18
Q06	di	23	30	-7	Use trends to make predictions	0.61	2	31	1.90	1.55	0.81	0.25	0.05	0.01	0.00	0.00	0.61
Q06	dii	24	14	10	Use trends to make predictions	1.27	2	64	1.94	1.83	1.58	1.26	0.93	0.55	0.20	0.02	1.27
Q07	a	25	19	6	Sources of data	0.51	1	51	0.76	0.64	0.58	0.51	0.42	0.33	0.22	0.09	0.51
Q07	b	26	6	20	Hypothesis testing	0.82	1	82	0.99	0.97	0.93	0.86	0.75	0.53	0.28	0.12	0.82
Q07	c	27	24	3	Select and justify appropriate diagrams	1.22	3	41	2.48	2.09	1.67	1.09	0.56	0.25	0.07	0.05	1.22
Q07	d	28	26	2	Comparative pie chart	0.72	2	36	1.90	1.60	1.01	0.44	0.12	0.02	0.01	0.00	0.72
Q07	e	29	15	14	Comparative pie chart	0.57	1	57	0.82	0.77	0.69	0.57	0.43	0.31	0.14	0.05	0.57
Q08	a	30	31	-1	Sample means a	0.61	2	31	0.99	0.77	0.63	0.58	0.50	0.41	0.27	0.06	0.61
Q08	b	31	4	27	Use action and warning lines i	1.70	2	85	1.94	1.87	1.82	1.73	1.64	1.43	1.01	0.41	1.70
Q08	c	32	29	3	Use action and warning lines i	1.55	5	31	4.19	3.47	2.21	0.95	0.25	0.07	0.03	0.00	1.55
Q08	d	33	28	5	Use action and warning lines i	0.32	1	32	0.59	0.45	0.35	0.28	0.23	0.19	0.19	0.14	0.32
Q09	a	34	16	18	Tree diagrams	2.23	4	56	3.58	3.07	2.62	2.17	1.65	1.10	0.69	0.49	2.23
Q09	b	35	35	0	Characteristics of a binomial distribution	0.87	4	22	3.26	2.07	1.01	0.35	0.09	0.03	0.01	0.00	0.87
Q10		36	22	14	Use means and standard deviation to standardise and interpret data	2.83	6	47	5.49	5.06	4.31	2.56	0.95	0.33	0.12	0.07	2.83
						41.81	80	52	68.19	59.70	49.73	39.31	29.75	21.63	14.20	7.68	41.81

Useful for students to see H P1

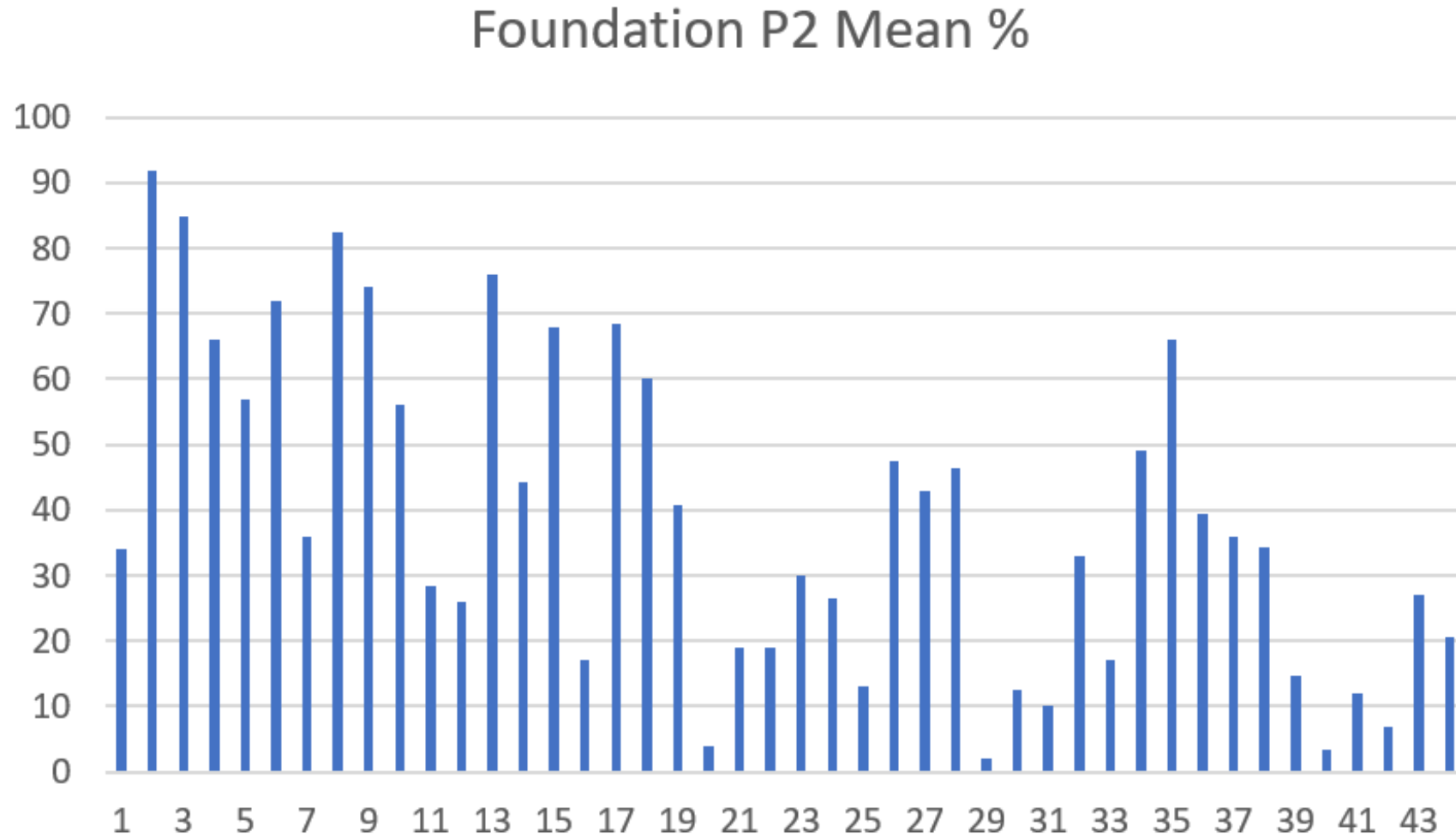




# F P2

Q	Part	Position in paper	Performance	Difference	Skill tested	Mean score	Max score	Mean %	5	4	3	2	1	U	ALL
Q01	a	1	24	-23	Probability statements of likelihood	0.34	1	34	0.51	0.41	0.33	0.24	0.15	0.11	0.34
Q01	b	2	1	1	Probability statements of likelihood	0.92	1	92	0.99	0.98	0.97	0.91	0.76	0.41	0.92
Q01	c	3	2	1	Probability scale	0.85	1	85	0.98	0.95	0.89	0.78	0.65	0.31	0.85
Q01	d	4	9	-5	Probability scale	0.66	1	66	0.93	0.83	0.66	0.45	0.30	0.10	0.66
Q02	a	5	12	-7	Bar chart with probabilities	0.57	1	57	0.90	0.79	0.56	0.31	0.11	0.02	0.57
Q02	b	6	6	0	Bar charts - mode from	0.72	1	72	0.95	0.87	0.74	0.57	0.38	0.18	0.72
Q02	c	7	21	-14	Bar charts - interpreting	0.36	1	36	0.60	0.48	0.34	0.21	0.09	0.02	0.36
Q03	a	8	3	5	Tally	1.65	2	83	1.89	1.84	1.71	1.55	1.20	0.51	1.65
Q03	b	9	5	4	Select an appropriate diagram	0.74	1	74	0.88	0.82	0.79	0.69	0.51	0.14	0.74
Q03	c	10	13	-3	Calculate mode	0.56	1	56	0.87	0.73	0.54	0.36	0.19	0.04	0.56
Q03	d	11	27	-16	Calculate median	0.57	2	28	1.14	0.72	0.39	0.22	0.14	0.05	0.57
Q03	e	12	30	-18	Rationale for selecting types of average	0.52	2	26	0.79	0.64	0.52	0.35	0.17	0.05	0.52
Q04	a	13	4	9	Probability from a list	0.76	1	76	0.95	0.92	0.83	0.65	0.31	0.08	0.76
Q04	b	14	17	-3	Compare data sets	1.77	4	44	3.10	2.44	1.67	0.73	0.24	0.03	1.77
Q04	c	15	8	7	Calculate using range	0.68	1	68	0.98	0.90	0.71	0.42	0.20	0.08	0.68
Q05		16	34	-18	Planning data collection	1.02	6	17	2.39	1.36	0.67	0.26	0.10	0.01	1.02
Q06	a	17	7	10	Bar charts - completing	1.37	2	69	1.80	1.63	1.47	1.11	0.58	0.12	1.37
Q06	b	18	11	7	Bar charts - interpreting	0.60	1	60	0.86	0.74	0.60	0.45	0.23	0.08	0.60
Q06	c	19	19	0	Bar charts - interpreting	1.22	3	41	2.18	1.61	1.09	0.66	0.28	0.09	1.22
Q07	a	20	42	-22	Definition of population	0.04	1	4	0.07	0.05	0.03	0.02	0.01	0.00	0.04
Q07	b	21	32	-11	Definition of convenience sample	0.19	1	19	0.40	0.24	0.14	0.07	0.03	0.00	0.19
Q07	c	22	33	-11	Disadvantages of sampling	0.19	1	19	0.45	0.25	0.13	0.06	0.02	0.00	0.19
Q07	d	23	26	-3	Tabulation	0.60	2	30	1.01	0.76	0.57	0.36	0.15	0.03	0.60
Q07	e	24	29	-5	Select an appropriate diagram	0.53	2	27	0.98	0.66	0.47	0.30	0.14	0.03	0.53
Q08	a	25	37	-12	Select an appropriate diagram	0.13	1	13	0.32	0.16	0.07	0.04	0.02	0.00	0.13
Q08	b	26	15	11	Scatter diagrams - completing	0.95	2	48	1.66	1.30	0.90	0.44	0.13	0.01	0.95
Q08	c	27	18	9	Correlation	0.86	2	43	1.48	1.17	0.81	0.42	0.15	0.01	0.86
Q08	d	28	16	12	Determine line of best fit	0.93	2	47	1.66	1.29	0.85	0.40	0.15	0.04	0.93
Q08	e	29	44	-15	Interpret Spearman's rank correlation coefficient	0.02	1	2	0.06	0.02	0.01	0.00	0.00	0.00	0.02
Q08	f	30	38	-8	Interpret Spearman's rank correlation coefficient	0.25	2	13	0.51	0.35	0.21	0.08	0.03	0.00	0.25
Q08	g	31	40	-9	Reliability and validity	0.20	2	10	0.65	0.25	0.06	0.02	0.01	0.00	0.20
Q09	a	32	25	7	Cleaning data	0.66	2	33	1.09	0.90	0.62	0.32	0.11	0.02	0.66
Q09	b	33	35	-2	Select an appropriate diagram	0.17	1	17	0.40	0.22	0.11	0.04	0.01	0.00	0.17
Q10	a	34	14	20	Difference between primary and secondary data	0.49	1	49	0.80	0.67	0.47	0.25	0.10	0.02	0.49
Q10	b	35	10	25	Choropleth map - reading	0.66	1	66	0.92	0.84	0.69	0.47	0.25	0.07	0.66
Q10	c	36	20	16	Choropleth map - interpreting	0.79	2	40	1.32	1.12	0.76	0.35	0.12	0.01	0.79
Q11	a	37	22	15	Definitions for types of data	0.36	1	36	0.58	0.41	0.31	0.26	0.21	0.10	0.36
Q11	b	38	23	15	Box plots - reading	1.03	3	34	1.53	1.51	0.56	0.16	0.03	0.00	1.03
Q11	c	39	36	3	Box plots - comparing	0.74	5	15	2.17	0.98	0.26	0.05	0.01	0.00	0.74
Q11	d	40	43	-3	Use stratification	0.10	3	3	0.37	0.09	0.02	0.01	0.00	0.00	0.10
Q12	a	41	39	2	Determine relative risks	0.36	3	12	0.90	0.50	0.21	0.06	0.02	0.00	0.36
Q12	b	42	41	1	Interpret relative risks	0.07	1	7	0.22	0.09	0.03	0.01	0.00	0.00	0.07
Q13	a	43	28	15	Median from cumulative frequency graph	0.27	1	27	0.55	0.31	0.20	0.14	0.09	0.02	0.27
Q13	b	44	31	13	Cumulative frequency graph - comparing	0.82	4	21	2.28	1.03	0.40	0.13	0.03	0.00	0.82
						27.29	80	34	47.04	34.83	24.37	15.38	8.41	2.79	27.29

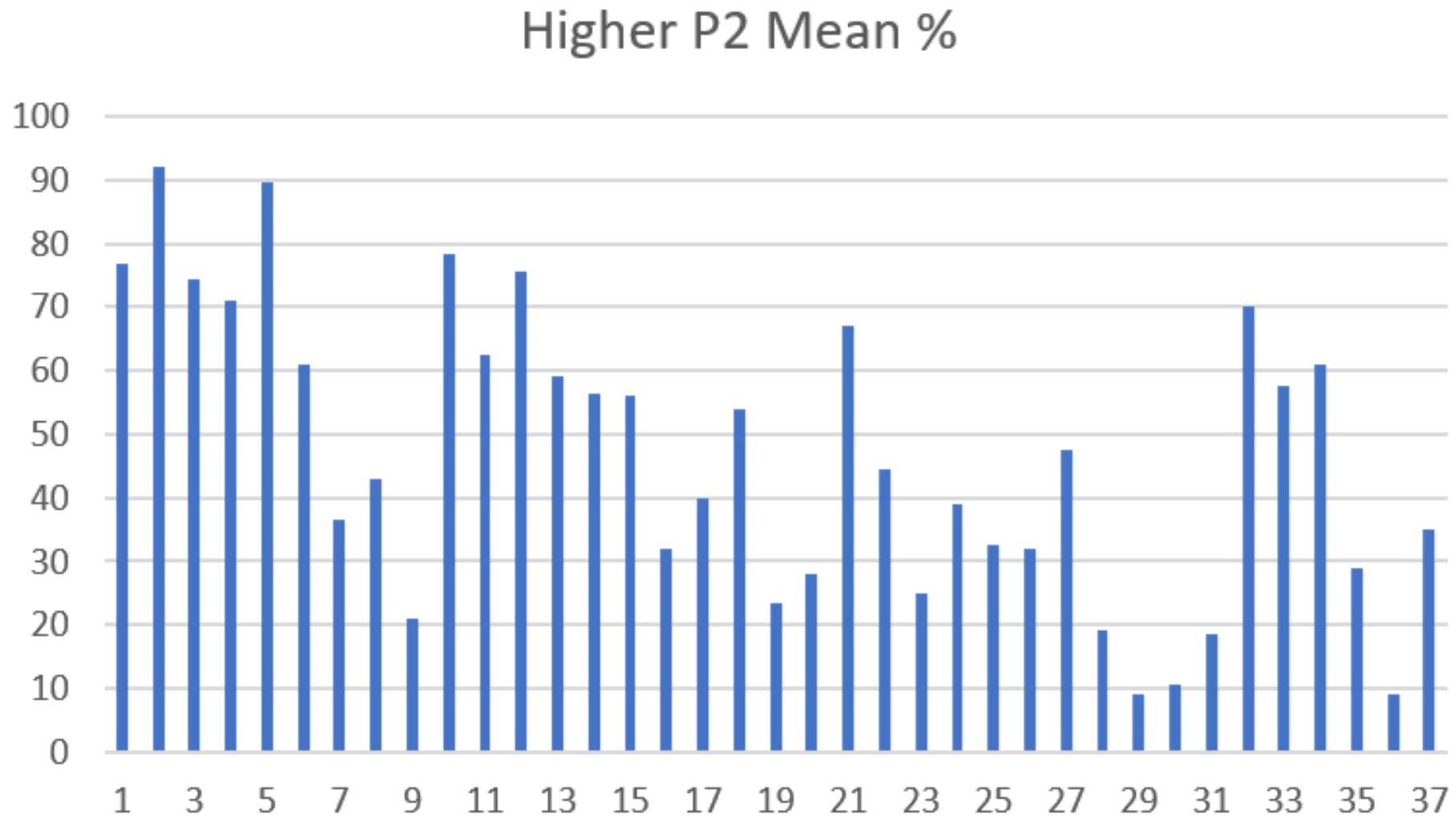
# Useful for students to see F P2



# H P2

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	Q	Part	Position in paper	Performance	Difference	Skill tested	Mean score	Max score	Mean %	9	8	7	6	5	4	3	U	ALL
2	Q01	a	1	4	-3	Difference between primary and secondary data	0.77	1	77	0.92	0.87	0.86	0.80	0.72	0.56	0.36	0.25	0.77
3	Q01	b	2	1	1	Choropleth map - reading	0.92	1	92	0.99	0.97	0.95	0.94	0.91	0.84	0.70	0.50	0.92
4	Q01	c	3	6	-3	Choropleth map - interpreting	1.49	2	75	1.76	1.66	1.59	1.51	1.40	1.25	0.94	0.44	1.49
5	Q02	a	4	7	-3	Definitions for types of data	0.71	1	71	0.97	0.92	0.83	0.72	0.57	0.43	0.31	0.32	0.71
6	Q02	b	5	2	3	Box plots - reading	2.69	3	90	2.92	2.93	2.88	2.83	2.67	2.11	1.16	0.50	2.69
7	Q02	c	6	11	-5	Box plots - comparing	3.05	5	61	4.48	4.08	3.63	3.12	2.40	1.48	0.54	0.21	3.05
8	Q02	d	7	23	-16	Use stratification	1.10	3	37	2.21	1.90	1.52	1.04	0.45	0.14	0.01	0.00	1.10
9	Q03	a	8	20	-12	Determine relative risks	1.29	3	43	2.77	2.15	1.49	1.04	0.76	0.52	0.24	0.08	1.29
10	Q03	b	9	32	-23	Interpret relative risks	0.21	1	21	0.40	0.29	0.25	0.20	0.17	0.09	0.02	0.02	0.21
11	Q04	a	10	3	7	Cumulative frequency- drawing	1.57	2	79	1.91	1.83	1.72	1.60	1.42	1.18	1.03	0.62	1.57
12	Q04	b	11	10	1	Cumulative frequency - using	1.25	2	63	1.89	1.77	1.56	1.28	0.92	0.46	0.20	0.10	1.25
13	Q05	a	12	5	7	Stem and leaf diagram	2.27	3	76	2.71	2.51	2.41	2.27	2.12	1.89	1.54	0.94	2.27
14	Q05	b	13	13	0	Calculate median	0.59	1	59	0.87	0.76	0.69	0.60	0.48	0.33	0.19	0.09	0.59
15	Q05	c	14	15	-1	Calculate interquartile range	1.13	2	56	1.76	1.58	1.42	1.16	0.82	0.39	0.10	0.02	1.13
16	Q05	d	15	16	-1	Compare data sets using appropriate measures	1.68	3	56	2.63	2.42	2.12	1.77	1.17	0.50	0.14	0.04	1.68
17	Q05	e	16	26	-10	Comment on appropriateness	0.32	1	32	0.64	0.52	0.41	0.28	0.16	0.09	0.04	0.01	0.32
18	Q05	f	17	21	-4	Limitations of data sources	0.40	1	40	0.72	0.60	0.48	0.38	0.28	0.13	0.02	0.01	0.40
19	Q06	a	18	17	1	Determine Spearman's rank correlation coefficient	3.23	6	54	5.23	4.77	4.24	3.30	2.11	0.88	0.30	0.27	3.23
20	Q06	b	19	31	-12	Extraneous variables	0.47	2	24	1.04	0.76	0.56	0.43	0.27	0.11	0.03	0.00	0.47
21	Q06	c	20	29	-9	Controlling extraneous variables	0.28	1	28	0.79	0.55	0.35	0.19	0.08	0.02	0.00	0.00	0.28
22	Q07	a	21	9	12	Use index numbers in context	1.34	2	67	1.91	1.87	1.71	1.39	0.94	0.54	0.25	0.08	1.34
23	Q07	b	22	19	3	Use index numbers in context	0.89	2	45	1.41	1.18	1.01	0.86	0.75	0.45	0.14	0.01	0.89
24	Q07	c	23	30	-7	Calculate price index	0.50	2	25	1.80	1.27	0.58	0.19	0.04	0.01	0.01	0.00	0.50
25	Q07	d	24	22	2	Use appropriate measure of central tendency	0.39	1	39	0.73	0.61	0.48	0.34	0.26	0.18	0.09	0.03	0.39
26	Q07	e	25	25	0	Calculate geometric mean	0.98	3	33	2.04	1.78	1.38	0.84	0.40	0.11	0.03	0.00	0.98
27	Q08		26	27	-1	Data Collection process	1.92	6	32	4.16	3.26	2.32	1.63	1.05	0.55	0.18	0.08	1.92
28	Q09	a	27	18	9	Interpret PMCC	0.95	2	48	1.79	1.53	1.23	0.89	0.51	0.30	0.18	0.06	0.95
29	Q09	b	28	33	-5	Interpret regression equations	0.19	1	19	0.81	0.50	0.18	0.04	0.01	0.00	0.00	0.00	0.19
30	Q09	c	29	36	-7	Use regression equations	0.27	3	9	1.10	0.57	0.25	0.14	0.07	0.03	0.01	0.01	0.27
31	Q09	d	30	35	-5	Compare regression equations	0.21	2	11	1.13	0.50	0.17	0.04	0.01	0.00	0.00	0.00	0.21
32	Q09	e	31	34	-3	Comment on appropriateness	0.37	2	19	0.94	0.64	0.44	0.28	0.20	0.09	0.04	0.00	0.37
33	Q10	a	32	8	24	Apply Petersen capture recapture formula	1.40	2	70	1.96	1.88	1.80	1.59	1.05	0.35	0.08	0.04	1.40
34	Q10	b	33	14	19	Reliability and replication	1.73	3	58	2.65	2.38	2.16	1.83	1.32	0.59	0.10	0.06	1.73
35	Q11	a	34	12	22	Venn diagrams	0.61	1	61	0.92	0.87	0.78	0.62	0.43	0.23	0.12	0.02	0.61
36	Q11	b	35	28	7	Formal notation for conditional probability	0.29	1	29	0.87	0.69	0.38	0.15	0.04	0.01	0.02	0.00	0.29
37	Q11	c	36	37	-1	Formal notation for independent events	0.09	1	9	0.48	0.21	0.05	0.02	0.00	0.00	0.00	0.00	0.09
38	Q11	d	37	24	13	General addition law	0.70	2	35	1.82	1.42	0.94	0.47	0.20	0.08	0.02	0.00	0.70
39							38.25	80	48	64.13	55.00	45.82	36.78	27.16	16.92	9.14	4.81	38.25
40																		

Useful for students to see H P2





Delving deeper to move  
students on

It's all about context

F P1

	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
	Q	Part	Skill tested	Mean score	Max score	Mean %	5	5%	4	4%	Diff to a 5	3	3%	Diff to a 4	2	1	U	ALL
	Q01	a	Pictogram - Completing	0.93	1	93	0.93	98.0%	0.95	98.0%	0.0%	0.97	97.0%	-1.0%	0.92	0.81	0.51	0.93
	Q03	ai	Tabulation - Reading	0.90	1	90	0.97	97.0%	0.94	94.0%	-3.0%	0.92	92.0%	-2.0%	0.89	0.80	0.42	0.90
	Q01	b	Pictogram - Using	1.73	2	87	1.92	96.0%	1.87	93.5%	-2.5%	1.82	91.0%	-2.5%	1.68	1.35	0.64	1.73
	Q03	aii	Tabulation - Reading	0.83	1	83	0.93	93.0%	0.90	90.0%	-3.0%	0.86	86.0%	-4.0%	0.80	0.65	0.26	0.83
	Q04	d	Calculate range	1.61	2	81	1.97	98.5%	1.93	96.5%	-2.0%	1.80	90.0%	-6.5%	1.40	0.73	0.09	1.61
	Q02	ai	Bar charts - completing	0.79	1	79	0.97	97.0%	0.94	94.0%	-3.0%	0.85	85.0%	-9.0%	0.69	0.38	0.07	0.79
	Q10	a	Histograms- using	1.56	2	78	1.94	97.0%	1.88	94.0%	-3.0%	1.74	87.0%	-7.0%	1.34	0.66	0.14	1.56
	Q02	b	Bar charts - completing	1.51	2	76	1.88	94.0%	1.77	88.5%	-5.5%	1.62	81.0%	-7.5%	1.36	0.80	0.16	1.51
	Q03	c	Tabulation - Comparing	1.50	2	75	1.77	88.5%	1.70	85.0%	-3.5%	1.58	79.0%	-6.0%	1.39	1.01	0.28	1.50
	Q04	b	Calculate median	1.49	2	75	1.84	92.0%	1.74	87.0%	-5.0%	1.59	79.5%	-7.5%	1.35	0.80	0.13	1.49
	Q05	a	Sample space diagrams - completing	1.49	2	75	1.92	96.0%	1.80	90.0%	-6.0%	1.57	78.5%	-11.5%	1.24	0.70	0.22	1.49
	Q03	e	Identify trends in data	0.74	1	74	0.90	90.0%	0.86	86.0%	-4.0%	0.80	80.0%	-6.0%	0.67	0.39	0.09	0.74
	Q03	b	Tabulation - Interpreting	0.65	1	65	0.84	84.0%	0.75	75.0%	-9.0%	0.65	65.0%	-10.0%	0.56	0.39	0.10	0.65
	Q07	a	Pie chart - comparing	1.28	2	64	1.66	83.0%	1.55	77.5%	-5.5%	1.39	69.5%	-8.0%	1.05	0.52	0.10	1.28
	Q01	c	Pictogram - Comparing	1.20	2	60	1.47	73.5%	1.36	68.0%	-5.5%	1.26	63.0%	-5.0%	1.08	0.75	0.27	1.20
	Q06	f	Reliability and validity	0.60	1	60	0.80	80.0%	0.73	73.0%	-7.0%	0.64	64.0%	-9.0%	0.48	0.25	0.04	0.60
	Q01	d	Importance of reliability and validity	1.16	2	58	1.67	83.5%	1.47	73.5%	-10.0%	1.18	59.0%	-14.5%	0.82	0.43	0.11	1.16
	Q11	a	Tree diagrams	1.14	2	57	1.82	91.0%	1.54	77.0%	-14.0%	1.15	57.5%	-19.5%	0.64	0.16	0.02	1.14
	Q05	c	Experimental v theoretical values	1.09	2	55	1.70	85.0%	1.40	70.0%	-15.0%	1.11	55.5%	-14.5%	0.71	0.24	0.04	1.09
	Q05	bi	Sample space diagrams - using	0.53	1	53	0.89	89.0%	0.73	73.0%	-16.0%	0.51	51.0%	-22.0%	0.28	0.09	0.01	0.53
	Q02	aii	Bar charts - completing	0.50	1	50	0.78	78.0%	0.65	65.0%	-13.0%	0.48	48.0%	-17.0%	0.33	0.15	0.02	0.50
	Q02	c	Bar charts - Comparing	0.99	2	50	1.58	79.0%	1.25	62.5%	-16.5%	0.94	47.0%	-15.5%	0.67	0.34	0.05	0.99
	Q06	eii	Planning data collection	0.87	2	44	1.39	69.5%	1.13	56.5%	-13.0%	0.84	42.0%	-14.5%	0.56	0.25	0.03	0.87
	Q03	d	Time series	0.84	2	42	1.35	67.5%	1.08	54.0%	-13.5%	0.84	42.0%	-14.0%	0.52	0.16	0.01	0.84
	Q04	e	Compare data sets using range and median	1.68	4	42	3.17	79.3%	2.32	58.0%	-21.3%	1.52	38.0%	-20.0%	0.70	0.14	0.01	1.68
	Q06	ci	Systematic sampling	0.42	1	42	0.69	69.0%	0.56	56.0%	-13.0%	0.39	39.0%	-17.0%	0.23	0.09	0.01	0.42
	Q08	a	Tabulation - Reading	0.84	2	42	1.56	78.0%	1.19	59.5%	-18.5%	0.74	37.0%	-22.5%	0.32	0.07	0.00	0.84
	Q08	bii	Arithmetic mean	0.41	1	41	0.77	77.0%	0.56	56.0%	-21.0%	0.36	36.0%	-20.0%	0.17	0.05	0.01	0.41
	Q06	a	Hypothesis testing	0.37	1	37	0.69	69.0%	0.50	50.0%	-19.0%	0.33	33.0%	-17.0%	0.16	0.07	0.01	0.37
	Q06	d	Questionnaires	0.73	2	37	1.05	52.5%	0.89	44.5%	-8.0%	0.76	38.0%	-6.5%	0.57	0.28	0.06	0.73
	Q04	a	Definitions of different types of data	0.34	1	34	0.53	53.0%	0.39	39.0%	-14.0%	0.31	31.0%	-8.0%	0.24	0.20	0.10	0.34
	Q08	biii	Arithmetic mean	0.33	1	33	0.68	68.0%	0.46	46.0%	-22.0%	0.27	27.0%	-19.0%	0.12	0.04	0.01	0.33
	Q11	b	Formal notation for independent events	1.10	4	28	3.10	77.5%	1.47	36.8%	-40.8%	0.50	12.5%	-24.3%	0.16	0.02	0.01	1.10
	Q07	b	Pie chart	0.54	2	27	1.29	64.5%	0.76	38.0%	-26.5%	0.33	16.5%	-21.5%	0.10	0.02	0.00	0.54
	Q05	bii	Sample space diagrams - using	0.26	1	26	0.61	61.0%	0.34	34.0%	-27.0%	0.17	17.0%	-17.0%	0.08	0.03	0.00	0.26
	Q09		Population pyramid	1.27	5	25	2.65	53.0%	1.68	33.5%	-19.4%	1.05	21.0%	-12.6%	0.48	0.11	0.00	1.27
	Q08	bi	Arithmetic mean	0.69	3	23	1.73	57.7%	0.91	30.3%	-27.3%	0.43	14.8%	-16.0%	0.16	0.04	0.00	0.69
	Q06	cii	Systematic sampling	0.40	2	20	1.02	51.0%	0.58	29.0%	-22.0%	0.22	11.0%	-18.0%	0.05	0.02	0.00	0.40
	Q02	d	Justify the appropriateness	0.39	2	20	0.85	42.5%	0.49	24.5%	-18.0%	0.29	14.5%	-10.0%	0.16	0.05	0.01	0.39
	Q04	c	Justify the rationale for using median	0.19	1	19	0.32	32.0%	0.21	21.0%	-11.0%	0.16	16.0%	-5.0%	0.14	0.09	0.03	0.19
	Q06	b	Systematic sampling	0.12	1	12	0.31	31.0%	0.17	17.0%	-14.0%	0.07	7.0%	-10.0%	0.03	0.00	0.00	0.12
	Q06	ei	Planning data collection	0.12	1	12	0.29	29.0%	0.15	15.0%	-14.0%	0.07	7.0%	-8.0%	0.03	0.01	0.00	0.12
1	Q10	b	Histograms - using	0.16	2	8	0.46	23.0%	0.17	8.5%	-14.5%	0.08	4.0%	-4.5%	0.06	0.03	0.01	0.16
	Q08	c	Select and justify appropriate diagrams	0.13	2	7	0.40	20.0%	0.15	7.5%	-12.5%	0.05	2.5%	-5.0%	0.02	0.01	0.00	0.13
2	Q10	c	Skewness	0.11	2	6	0.29	14.5%	0.14	7.0%	-7.5%	0.08	4.0%	-3.0%	0.03	0.01	0.00	0.11
				24.22	35	46	36.20		32.74			28.43			22.35	13.40	3.77	24.22



# HP1

Q	Part	Skill tested	Mean score	Max score	Mean %	9	9%	8	8%	Diff to a 9	7	7%	Diff to a 9	6	5	4	3	U	ALL
Q04	a	Histograms- using	1.95	2	98	1.99	99.5%	1.97	98.5%	-1.0%	1.96	98.0%	-1.5%	1.95	1.95	1.92	1.89	1.58	1.95
Q01	aii	Rates of change over time - using	0.96	1	96	0.99	99.0%	0.98	98.0%	-1.0%	0.98	98.0%	-1.0%	0.97	0.96	0.90	0.85	0.72	0.96
Q01	ai	Rates of change over time - using	1.85	2	93	1.98	99.0%	1.96	98.0%	-1.0%	1.93	96.5%	-2.5%	1.89	1.81	1.63	1.28	0.97	1.85
Q08	b	Use action and warning lines i	1.70	2	85	1.94	97.0%	1.87	93.5%	-3.5%	1.82	91.0%	-6.0%	1.73	1.64	1.43	1.01	0.41	1.70
Q02	bii	Arithmetic mean	0.84	1	84	0.99	99.0%	0.98	98.0%	-1.0%	0.94	94.0%	-5.0%	0.90	0.76	0.58	0.39	0.13	0.84
Q07	b	Hypothesis testing	0.82	1	82	0.99	99.0%	0.97	97.0%	-2.0%	0.93	93.0%	-6.0%	0.86	0.75	0.53	0.28	0.12	0.82
Q06	a	Identify trends in data	1.59	2	80	1.96	98.0%	1.92	96.0%	-2.0%	1.84	92.0%	-6.0%	1.67	1.38	1.03	0.65	0.37	1.59
Q02	a	Tabulation - Reading	1.55	2	78	1.95	97.5%	1.86	93.0%	-4.5%	1.74	87.0%	-10.5%	1.59	1.37	1.07	0.75	0.38	1.55
Q02	bi	Arithmetic mean	2.16	3	72	2.90	96.7%	2.79	93.0%	-3.7%	2.61	87.0%	-9.7%	2.27	1.77	1.07	0.43	0.19	2.16
Q02	biii	Arithmetic mean	0.67	1	67	0.88	88.0%	0.81	81.0%	-7.0%	0.76	76.0%	-12.0%	0.70	0.59	0.44	0.25	0.02	0.67
Q06	b	Interpret seasonal trends in context	2.00	3	67	2.66	88.7%	2.46	82.0%	-6.7%	2.28	76.0%	-12.7%	2.04	1.78	1.26	0.51	0.08	2.00
Q05	aii	Reliability and validity	1.33	2	67	1.76	88.0%	1.68	84.0%	-4.0%	1.51	75.5%	-12.5%	1.35	1.16	0.84	0.48	0.20	1.33
Q03		Population pyramid	3.30	5	66	4.69	93.8%	4.31	86.2%	-7.6%	3.84	76.8%	-17.0%	3.33	2.61	1.91	1.24	0.48	3.30
Q06	dii	Use trends to make predictions	1.27	2	64	1.94	97.0%	1.83	91.5%	-5.5%	1.58	79.0%	-18.0%	1.26	0.93	0.55	0.20	0.02	1.27
Q07	e	Comparative pie chart	0.57	1	57	0.82	82.0%	0.77	77.0%	-5.0%	0.69	69.0%	-13.0%	0.57	0.43	0.31	0.14	0.05	0.57
Q09	a	Tree diagrams	2.23	4	56	3.58	89.5%	3.07	76.8%	-12.8%	2.62	65.5%	-24.0%	2.17	1.65	1.10	0.69	0.49	2.23
Q04	c	Skewness	1.05	2	53	1.79	89.5%	1.57	78.5%	-11.0%	1.32	66.0%	-23.5%	1.05	0.65	0.36	0.20	0.05	1.05
Q05	b	Questionnaires	1.03	2	52	1.65	82.5%	1.42	71.0%	-11.5%	1.22	61.0%	-21.5%	0.97	0.78	0.55	0.31	0.16	1.03
Q07	a	Sources of data	0.51	1	51	0.76	76.0%	0.64	64.0%	-12.0%	0.58	58.0%	-18.0%	0.51	0.42	0.33	0.22	0.09	0.51
Q04	b	Histograms - using	1.00	2	50	1.80	90.0%	1.61	80.5%	-9.5%	1.31	65.5%	-24.5%	0.96	0.55	0.25	0.16	0.06	1.00
Q05	c	Problems with collected data	0.98	2	49	1.31	65.5%	1.16	58.0%	-7.5%	1.06	53.0%	-12.5%	0.99	0.86	0.74	0.51	0.23	0.98
Q10		Use means and standard deviation to standardise and interpret data	2.83	6	47	5.49	91.5%	5.06	84.3%	-7.2%	4.31	71.8%	-19.7%	2.56	0.95	0.33	0.12	0.07	2.83
Q05	e	Interviews v questionnaires	0.45	1	45	0.74	74.0%	0.62	62.0%	-12.0%	0.49	49.0%	-25.0%	0.42	0.36	0.29	0.19	0.10	0.45
Q07	c	Select and justify appropriate diagrams	1.22	3	41	2.48	82.7%	2.09	69.7%	-13.0%	1.67	55.7%	-27.0%	1.09	0.56	0.25	0.07	0.05	1.22
Q01	b	Rates of change over time - using	0.81	2	41	1.08	54.0%	0.87	43.5%	-10.5%	0.83	41.5%	-12.5%	0.77	0.77	0.68	0.65	0.42	0.81
Q07	d	Comparative pie chart	0.72	2	36	1.90	95.0%	1.60	80.0%	-15.0%	1.01	50.5%	-44.5%	0.44	0.12	0.02	0.01	0.00	0.72
Q02	c	Select and justify appropriate diagrams	0.68	2	34	1.27	63.5%	1.03	51.5%	-12.0%	0.82	41.0%	-22.5%	0.67	0.43	0.22	0.09	0.02	0.68
Q08	d	Use action and warning lines i	0.32	1	32	0.59	59.0%	0.45	45.0%	-14.0%	0.35	35.0%	-24.0%	0.28	0.23	0.19	0.19	0.14	0.32
Q08	c	Use action and warning lines i	1.55	5	31	4.19	83.8%	3.47	69.4%	-14.4%	2.21	44.2%	-39.6%	0.95	0.25	0.07	0.03	0.00	1.55
Q06	di	Use trends to make predictions	0.61	2	31	1.90	95.0%	1.55	77.5%	-17.5%	0.81	40.5%	-54.5%	0.25	0.05	0.01	0.00	0.00	0.61
Q08	a	Sample means a	0.61	2	31	0.99	49.5%	0.77	38.5%	-11.0%	0.63	31.5%	-18.0%	0.58	0.50	0.41	0.27	0.06	0.61
Q05	d	Systematic sampling	0.90	3	30	1.96	65.3%	1.46	48.7%	-16.7%	1.11	37.0%	-28.3%	0.80	0.49	0.26	0.10	0.02	0.90
Q05	ai	Reasons for employing judgement sampling	0.26	1	26	0.65	65.0%	0.45	45.0%	-20.0%	0.32	32.0%	-33.0%	0.21	0.11	0.06	0.03	0.00	0.26
Q06	ci	Interpret seasonal trends in context	0.44	2	22	1.63	81.5%	1.12	56.0%	-25.5%	0.47	23.5%	-58.0%	0.16	0.03	0.01	0.00	0.00	0.44
Q09	b	Characteristics of a binomial distribution	0.87	4	22	3.26	81.5%	2.07	51.8%	-29.8%	1.01	25.3%	-56.3%	0.35	0.09	0.03	0.01	0.00	0.87
Q06	cii	Interpret seasonal trends in context	0.18	1	18	0.73	73.0%	0.46	46.0%	-27.0%	0.17	17.0%	-56.0%	0.05	0.01	0.00	0.00	0.00	0.18
			27.38	39	52	45.22		41.86			38.15			33.78	28.39	21.81	14.77	6.51	27.38

F P2

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
Q	Part	Skill tested	Mean score	Max score	Mean %	5	5%	4	4%	Diff to a 5	3	3%	Diff to a 4	2	1	U	ALL
Q01	b	Probability statements of likelihood	0.92	1	92	0.99	99.0%	0.98	98.0%	-1.0%	0.97	97.0%	-1.0%	0.91	0.76	0.41	0.92
Q01	c	Probability scale	0.85	1	85	0.98	98.0%	0.95	95.0%	-3.0%	0.89	89.0%	-6.0%	0.78	0.65	0.31	0.85
Q03	a	Tally	1.65	2	83	1.89	94.5%	1.84	92.0%	-2.5%	1.71	85.5%	-6.5%	1.55	1.20	0.51	1.65
Q04	a	Probability from a list	0.76	1	76	0.95	95.0%	0.92	92.0%	-3.0%	0.83	83.0%	-9.0%	0.65	0.31	0.08	0.76
Q03	b	Select an appropriate diagram	0.74	1	74	0.88	88.0%	0.82	82.0%	-6.0%	0.79	79.0%	-3.0%	0.69	0.51	0.14	0.74
Q02	b	Bar charts - mode from	0.72	1	72	0.95	95.0%	0.87	87.0%	-8.0%	0.74	74.0%	-13.0%	0.57	0.38	0.18	0.72
Q06	a	Bar charts - completing	1.37	2	69	1.80	90.0%	1.63	81.5%	-8.5%	1.47	73.5%	-8.0%	1.11	0.58	0.12	1.37
Q04	c	Calculate using range	0.68	1	68	0.98	98.0%	0.90	90.0%	-8.0%	0.71	71.0%	-19.0%	0.42	0.20	0.08	0.68
Q01	d	Probability scale	0.66	1	66	0.93	93.0%	0.83	83.0%	-10.0%	0.66	66.0%	-17.0%	0.45	0.30	0.10	0.66
Q10	b	Choropleth map - reading	0.66	1	66	0.92	92.0%	0.84	84.0%	-8.0%	0.69	69.0%	-15.0%	0.47	0.25	0.07	0.66
Q06	b	Bar charts - interpreting	0.60	1	60	0.85	85.0%	0.74	74.0%	-11.0%	0.60	60.0%	-14.0%	0.45	0.23	0.08	0.60
Q02	a	Bar chart with probabilities	0.57	1	57	0.90	90.0%	0.79	79.0%	-11.0%	0.56	56.0%	-23.0%	0.31	0.11	0.02	0.57
Q03	c	Calculate mode	0.56	1	56	0.87	87.0%	0.73	73.0%	-14.0%	0.54	54.0%	-19.0%	0.36	0.19	0.04	0.56
Q10	a	Difference between primary and secondary data	0.49	1	49	0.80	80.0%	0.67	67.0%	-13.0%	0.47	47.0%	-20.0%	0.25	0.10	0.02	0.49
Q08	b	Scatter diagrams - completing	0.95	2	48	1.65	82.5%	1.30	65.0%	-17.5%	0.90	45.0%	-20.0%	0.44	0.13	0.01	0.95
Q08	d	Determine line of best fit	0.93	2	47	1.65	82.5%	1.29	64.5%	-18.0%	0.85	42.5%	-22.0%	0.40	0.15	0.04	0.93
Q04	b	Compare data sets	1.77	4	44	3.10	77.5%	2.44	61.0%	-16.5%	1.67	41.8%	-19.3%	0.73	0.24	0.03	1.77
Q08	c	Correlation	0.86	2	43	1.48	74.0%	1.17	58.5%	-15.5%	0.81	40.5%	-18.0%	0.42	0.15	0.01	0.86
Q06	c	Bar charts - interpreting	1.22	3	41	2.13	71.0%	1.61	53.7%	-17.3%	1.09	36.3%	-17.3%	0.66	0.28	0.09	1.22
Q10	c	Choropleth map - interpreting	0.79	2	40	1.32	66.0%	1.12	56.0%	-10.0%	0.76	38.0%	-18.0%	0.35	0.12	0.01	0.79
Q02	c	Bar charts - interpreting	0.36	1	36	0.60	60.0%	0.48	48.0%	-12.0%	0.34	34.0%	-14.0%	0.21	0.09	0.02	0.36
Q11	a	Definitions for types of data	0.36	1	36	0.58	58.0%	0.41	41.0%	-17.0%	0.31	31.0%	-10.0%	0.26	0.21	0.10	0.36
Q11	b	Box plots - reading	1.03	3	34	2.53	84.3%	1.51	50.3%	-34.0%	0.56	18.7%	-31.7%	0.16	0.03	0.00	1.03
Q01	a	Probability statements of likelihood	0.34	1	34	0.51	51.0%	0.41	41.0%	-10.0%	0.33	33.0%	-8.0%	0.24	0.15	0.11	0.34
Q09	a	Cleaning data	0.66	2	33	1.09	54.5%	0.90	45.0%	-9.5%	0.62	31.0%	-14.0%	0.32	0.11	0.02	0.66
Q07	d	Tabulation	0.60	2	30	1.01	50.5%	0.76	38.0%	-12.5%	0.57	28.5%	-9.5%	0.36	0.15	0.03	0.60
Q03	d	Calculate median	0.57	2	28	1.24	62.0%	0.72	36.0%	-26.0%	0.39	19.5%	-16.5%	0.22	0.14	0.05	0.57
Q13	a	Median from cumulative frequency graph	0.27	1	27	0.55	55.0%	0.31	31.0%	-24.0%	0.20	20.0%	-11.0%	0.14	0.09	0.02	0.27
Q07	e	Select an appropriate diagram	0.53	2	27	0.93	46.5%	0.66	33.0%	-13.5%	0.47	23.5%	-9.5%	0.30	0.14	0.03	0.53
Q03	e	Rationale for selecting types of average	0.52	2	26	0.79	39.5%	0.64	32.0%	-7.5%	0.52	26.0%	-6.0%	0.35	0.17	0.05	0.52
Q13	b	Cumulative frequency graph - comparing	0.82	4	21	2.28	57.0%	1.03	25.8%	-31.3%	0.40	10.0%	-15.8%	0.13	0.03	0.00	0.82
Q07	b	Definition of convenience sample	0.19	1	19	0.40	40.0%	0.24	24.0%	-16.0%	0.14	14.0%	-10.0%	0.07	0.03	0.00	0.19
Q07	c	Disadvantages of sampling	0.19	1	19	0.45	45.0%	0.25	25.0%	-20.0%	0.13	13.0%	-12.0%	0.06	0.02	0.00	0.19
Q05		Planning data collection	1.02	6	17	2.39	39.8%	1.36	22.7%	-17.2%	0.67	11.2%	-11.5%	0.26	0.10	0.01	1.02
Q09	b	Select an appropriate diagram	0.17	1	17	0.40	40.0%	0.22	22.0%	-18.0%	0.11	11.0%	-11.0%	0.04	0.01	0.00	0.17
Q11	c	Box plots - comparing	0.74	5	15	2.17	43.4%	0.98	19.6%	-23.8%	0.26	5.2%	-14.4%	0.05	0.01	0.00	0.74
Q08	a	Select an appropriate diagram	0.13	1	13	0.32	32.0%	0.16	16.0%	-16.0%	0.07	7.0%	-9.0%	0.04	0.02	0.00	0.13
Q08	f	Interpret Spearman's rank correlation coefficient	0.25	2	13	0.51	25.5%	0.35	17.5%	-8.0%	0.21	10.5%	-7.0%	0.08	0.03	0.00	0.25
Q12	a	Determine relative risks	0.36	3	12	0.90	30.0%	0.50	16.7%	-13.3%	0.21	7.0%	-9.7%	0.06	0.02	0.00	0.36
Q08	g	Reliability and validity	0.20	2	10	0.65	32.5%	0.25	12.5%	-20.0%	0.06	3.0%	-9.5%	0.02	0.01	0.00	0.20
Q12	b	Interpret relative risks	0.07	1	7	0.22	22.0%	0.09	9.0%	-13.0%	0.03	3.0%	-6.0%	0.01	0.00	0.00	0.07
Q07	a	Definition of population	0.04	1	4	0.07	7.0%	0.05	5.0%	-2.0%	0.03	3.0%	-2.0%	0.02	0.01	0.00	0.04
Q11	d	Use stratification	0.10	3	3	0.37	12.3%	0.09	3.0%	-9.3%	0.02	0.7%	-2.3%	0.01	0.00	0.00	0.10
Q08	e	Interpret Spearman's rank correlation coefficient	0.02	1	2	0.06	6.0%	0.02	2.0%	-4.0%	0.01	1.0%	-1.0%	0.00	0.00	0.00	0.02
			27.29	80	34	47.04		34.83			24.37		15.38	8.41	2.79	27.29	



# H P2

Q	Part	Skill tested	Mean score	Max score	Mean %	9	9%	8	8%	Diff to a 9	7	7%	Diff to a 9	6	5	4	3	U	ALL
Q01	b	Choropleth map - reading	0.92	1	92	0.99	99.0%	0.97	97.0%	-2.0%	0.95	95.0%	-4.0%	0.94	0.91	0.84	0.70	0.50	0.92
Q02	b	Box plots - reading	2.69	3	90	2.92	97.3%	2.93	97.7%	0.3%	2.88	96.0%	-1.3%	2.83	2.67	2.11	1.16	0.50	2.69
Q04	a	Cumulative frequency- drawing	1.57	2	79	1.91	95.5%	1.83	91.5%	-4.0%	1.72	86.0%	-9.5%	1.60	1.42	1.18	1.03	0.62	1.57
Q01	a	Difference between primary and secondary data	0.77	1	77	0.92	92.0%	0.87	87.0%	-5.0%	0.86	86.0%	-6.0%	0.80	0.72	0.56	0.36	0.25	0.77
Q05	a	Stem and leaf diagram	2.27	3	76	2.71	90.3%	2.51	83.7%	-6.7%	2.41	80.3%	-10.0%	2.27	2.12	1.89	1.54	0.94	2.27
Q01	c	Choropleth map - interpreting	1.49	2	75	1.76	88.0%	1.66	83.0%	-5.0%	1.59	79.5%	-8.5%	1.51	1.40	1.25	0.94	0.44	1.49
Q02	a	Definitions for types of data	0.71	1	71	0.97	97.0%	0.92	92.0%	-5.0%	0.83	83.0%	-14.0%	0.72	0.57	0.43	0.31	0.32	0.71
Q10	a	Apply Petersen capture recapture formula	1.40	2	70	1.96	98.0%	1.88	94.0%	-4.0%	1.80	90.0%	-8.0%	1.59	1.05	0.35	0.08	0.04	1.40
Q07	a	Use index numbers in context	1.34	2	67	1.91	95.5%	1.87	93.5%	-2.0%	1.71	85.5%	-10.0%	1.39	0.94	0.54	0.25	0.08	1.34
Q04	b	Cumulative frequency - using	1.25	2	63	1.89	94.5%	1.77	88.5%	-6.0%	1.56	78.0%	-16.5%	1.28	0.92	0.46	0.20	0.10	1.25
Q02	c	Box plots - comparing	3.05	5	61	4.48	89.6%	4.08	81.6%	-8.0%	3.63	72.6%	-17.0%	3.12	2.40	1.48	0.54	0.21	3.05
Q11	a	Venn diagrams	0.61	1	61	0.92	92.0%	0.87	87.0%	-5.0%	0.78	78.0%	-14.0%	0.62	0.43	0.23	0.12	0.02	0.61
Q05	b	Calculate median	0.59	1	59	0.87	87.0%	0.76	76.0%	-11.0%	0.69	69.0%	-18.0%	0.60	0.48	0.33	0.19	0.09	0.59
Q10	b	Reliability and replication	1.73	3	58	2.65	88.3%	2.38	79.3%	-9.0%	2.16	72.0%	-16.3%	1.83	1.32	0.59	0.10	0.06	1.73
Q05	c	Calculate interquartile range	1.13	2	56	1.76	88.0%	1.58	79.0%	-9.0%	1.42	71.0%	-17.0%	1.16	0.82	0.39	0.10	0.02	1.13
Q05	d	Compare data sets using appropriate measures	1.68	3	56	2.63	87.7%	2.42	80.7%	-7.0%	2.12	70.7%	-17.0%	1.77	1.17	0.50	0.14	0.04	1.68
Q06	a	Determine Spearman's rank correlation coefficient	3.23	6	54	5.23	87.2%	4.77	79.5%	-7.7%	4.24	70.7%	-16.5%	3.30	2.11	0.88	0.30	0.27	3.23
Q09	a	Interpret PMCC	0.95	2	48	1.79	89.5%	1.53	76.5%	-13.0%	1.23	61.5%	-28.0%	0.89	0.51	0.30	0.18	0.06	0.95
Q07	b	Use index numbers in context	0.89	2	45	1.41	70.5%	1.18	59.0%	-11.5%	1.01	50.5%	-20.0%	0.86	0.75	0.45	0.14	0.01	0.89
Q03	a	Determine relative risks	1.29	3	43	2.77	92.3%	2.15	71.7%	-20.7%	1.49	49.7%	-42.7%	1.04	0.76	0.52	0.24	0.08	1.29
Q05	f	Limitations of data sources	0.40	1	40	0.72	72.0%	0.60	60.0%	-12.0%	0.48	48.0%	-24.0%	0.38	0.28	0.13	0.02	0.01	0.40
Q07	d	Use appropriate measure of central tendency	0.39	1	39	0.73	73.0%	0.61	61.0%	-12.0%	0.48	48.0%	-25.0%	0.34	0.26	0.18	0.09	0.03	0.39
Q02	d	Use stratification	1.10	3	37	2.21	73.7%	1.90	63.3%	-10.3%	1.52	50.7%	-23.0%	1.04	0.45	0.14	0.01	0.00	1.10
Q11	d	General addition law	0.70	2	35	1.82	91.0%	1.42	71.0%	-20.0%	0.94	47.0%	-44.0%	0.47	0.20	0.08	0.02	0.00	0.70
Q07	e	Calculate geometric mean	0.98	3	33	2.04	68.0%	1.78	59.3%	-8.7%	1.38	46.0%	-22.0%	0.84	0.40	0.11	0.03	0.00	0.98
Q05	e	Comment on appropriateness	0.32	1	32	0.64	64.0%	0.52	52.0%	-12.0%	0.41	41.0%	-23.0%	0.28	0.16	0.09	0.04	0.01	0.32
Q08		Data Collection process	1.92	6	32	4.16	69.3%	3.26	54.3%	-15.0%	2.32	38.7%	-30.7%	1.63	1.05	0.55	0.18	0.08	1.92
Q11	b	Formal notation for conditional probability	0.29	1	29	0.87	87.0%	0.69	69.0%	-18.0%	0.38	38.0%	-49.0%	0.15	0.04	0.01	0.02	0.00	0.29
Q06	c	Controlling extraneous variables	0.28	1	28	0.79	79.0%	0.55	55.0%	-24.0%	0.35	35.0%	-44.0%	0.19	0.08	0.02	0.00	0.00	0.28
Q07	c	Calculate price index	0.50	2	25	1.80	90.0%	1.27	63.5%	-26.5%	0.58	29.0%	-61.0%	0.19	0.04	0.01	0.01	0.00	0.50
Q06	b	Extraneous variables	0.47	2	24	1.04	52.0%	0.76	38.0%	-14.0%	0.56	28.0%	-24.0%	0.43	0.27	0.11	0.03	0.00	0.47
Q03	b	Interpret relative risks	0.21	1	21	0.40	40.0%	0.29	29.0%	-11.0%	0.25	25.0%	-15.0%	0.20	0.17	0.09	0.02	0.02	0.21
Q09	b	Interpret regression equations	0.19	1	19	0.81	81.0%	0.50	50.0%	-31.0%	0.18	18.0%	-63.0%	0.04	0.01	0.00	0.00	0.00	0.19
Q09	e	Comment on appropriateness	0.37	2	19	0.94	47.0%	0.64	32.0%	-15.0%	0.44	22.0%	-25.0%	0.28	0.20	0.09	0.04	0.00	0.37
Q09	d	Compare regression equations	0.21	2	11	1.13	56.5%	0.50	25.0%	-31.5%	0.17	8.5%	-48.0%	0.04	0.01	0.00	0.00	0.00	0.21
Q09	c	Use regression equations	0.27	3	9	1.10	36.7%	0.57	19.0%	-17.7%	0.25	8.3%	-28.3%	0.14	0.07	0.03	0.01	0.01	0.27
Q11	c	Formal notation for independent events	0.09	1	9	0.48	48.0%	0.21	21.0%	-27.0%	0.05	5.0%	-43.0%	0.02	0.00	0.00	0.00	0.00	0.09
			38.25	80	48	64.13		55.00			45.82			36.78	27.16	16.92	9.14	4.81	38.25

Delving deeper to move students on

Its all about context

You could also look at grades 1 & 2 (F) or 4, 5 & 6 (H)



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or 4, 5 & 6 (H)

# Extended Answers



# Previously identified as an area for improvement

Q	Part	Position in paper	Performance	Difference	Skill tested	Mean score	Max score	Mean %	9	8	7	6	5	4	3	2	1	U	All
Q01	a	1	1	0	Pictogram - Completing	0.93	1	93	0.98	0.98	0.97	0.92	0.81	0.51	0.0	0.0	0.0	0.0	0.0
Q03	ai	10	2	8	Tabulation - Reading	0.90	1	90	0.97	0.94	0.92	0.89	0.80	0.42	0.0	0.0	0.0	0.0	0.0
Q01	b	2	3	-1	Pictogram - Using	1.73	2	87	1.92	1.87	1.82	1.68	1.35	0.64	1.73	0.0	0.0	0.0	0.0
Q03	aii	11	4	7	Tabulation - Reading	0.83	1	83	0.93	0.90	0.86	0.80	0.65	0.26	0.83	0.0	0.0	0.0	0.0
Q04	d	19	5	14	Calculate range	1.61	2	81	1.97	1.93	1.80	1.40	0.73	0.09	1.61	0.0	0.0	0.0	0.0
Q02	ai	5	6	-1	Bar charts - completing	0.79	1	79	0.97	0.94	0.85	0.69	0.38	0.07	0.79	0.0	0.0	0.0	0.0
Q10	a	41	7	34	Histograms - using	1.56	2	78	1.94	1.88	1.74	1.34	0.66	0.14	1.56	0.0	0.0	0.0	0.0
Q02	b	7	8	-1	Bar charts - completing	1.51	2	76	1.88	1.77	1.62	1.36	0.80	0.16	1.51	0.0	0.0	0.0	0.0
Q03	c	13	9	4	Tabulation - Comparing	1.50	2	75	1.77	1.70	1.58	1.39	1.01	0.28	1.50	0.0	0.0	0.0	0.0
Q04	b	17	10	7	Calculate median	1.49	2	75	1.84	1.74	1.59	1.35	0.80	0.13	1.49	0.0	0.0	0.0	0.0
Q05	a	21	11	10	Sample space diagrams - completing	1.49	2	75	1.92	1.80	1.57	1.24	0.70	0.22	1.49	0.0	0.0	0.0	0.0
Q03	e	15	12	3	Identify trends in data	0.74	1	74	0.90	0.86	0.80	0.67	0.39	0.09	0.74	0.0	0.0	0.0	0.0
Q09			40	36	4	Population pyramid							1.27		5		25		
Q08	bi		36	37	-1	Arithmetic mean							0.69		3		23		
Q06	cii		28	38	-10	Systematic sampling							0.40		2		20		
Q02	d		9	39	-30	Justify the appropriateness							0.39		2		20		
Q04	c		18	40	-22	Justify the rationale for using median							0.19		1		19		
Q06	b		26	41	-15	Systematic sampling							0.12		1		12		
Q06	ei		30	42	-12	Planning data collection							0.12		1		12		
Q10	b		42	43	-1	Histograms - using													
Q08	c		39	44	-5	Select and justify appropriate diagrams													
Q10	c		43	45	-2	Skewness													

Q	Part	Position in paper	Performance	Difference
Q04	a	10	1	9
Q01	aii	2	2	0
Q01	ai	1	3	-2
Q08	b	31	4	27
Q02	bii	6	5	1
Q07	b	26	6	20
Q08	d	34	3	28
Q08	c		32	29
Q06	di		23	30
Q08	a		30	31
Q05	d		17	32
Q05	ai		13	33
Q06	ci		21	34
Q09	b		35	35

F P1

Q	Part	Position in paper	Performance	Difference	Skill tested	Mean score	Max score	Mean %	9	8	7	6	5	4	3	U	ALL
Q04	a	10	1	9	Histograms - using	1.95	2	98	1.99	1.97	1.96	1.95	1.95	1.92	1.89	1.58	1.95
Q01	aii	2	2	0	Rates of change over time - using	0.96	1	96	0.99	0.98	0.98	0.97	0.96	0.90	0.85	0.72	0.96
Q01	ai	1	3	-2	Rates of change over time - using	1.85	2	93	1.98	1.96	1.93	1.89	1.81	1.63	1.28	0.97	1.85
Q08	b	31	4	27	Use action and warning lines i	1.70	2	85	1.94	1.87	1.82	1.73	1.64	1.43	1.01	0.41	1.70
Q02	bii	6	5	1	Arithmetic mean	0.84	1	84	0.99	0.98	0.94	0.90	0.76	0.58	0.39	0.13	0.84
Q07	b	26	6	20	Hypothesis testing	0.82	1	82	0.99	0.97	0.93	0.86	0.75	0.53	0.28	0.12	0.82
Q08	d	33	28	5	Use action and warning lines i								0.32		1	32	U
Q08	c	32	29	3	Use action and warning lines i								1.55		5	31	4
Q06	di	23	30	-7	Use trends to make predictions								0.61		2	31	1
Q08	a	30	31	-1	Sample means a								0.61		2	31	0
Q05	d	17	32	-15	Systematic sampling								0.90		3	30	1
Q05	ai	13	33	-20	Reasons for employing judgement sampling								0.26		1	26	0
Q06	ci	21	34	-13	Interpret seasonal trends in context								0.44		2	22	1
Q09	b	35	35	0	Characteristics of a binomial distribution								0.87		4	22	3
Q06	cii	22	36	-14	Interpret seasonal trends in context								0.18		1	18	0
													27.38		39	52	45

H P1



# Foundation P2 Q5

WRITE IN THIS AREA

- 5 Claire is planning an investigation into the length of time that a learner has to wait for a driving test.

She wants to find out about how waiting time varies in different regions of the UK.

Here is her plan for data collection, for calculations and for diagrams.

## Data collection

Visit a random sample of driving test centres in each region to ask for their waiting time in June.

## Calculations

Calculate the average waiting time for each region for June.

Calculate the range of the waiting times for each region for June.

## Diagrams

Draw a bar chart showing the average waiting time for each region in June.

Draw a pie chart showing the

Discuss whether Claire's plans for data are appropriate.

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

## Data collection

eg • taking a random sample means each test centre has an equally likely chance of being selected but it would be quicker, easier and cheaper to collect data from the internet. Data for more than one month should be collected which would make it more appropriate.

## Calculations

Calculating an average is a good way to compare waiting times for each region but she hasn't said which average she'll use. The range is a good way to measure spread so is appropriate.

Diagrams A bar chart is not appropriate for wait times as it's continuous data and a pie chart is not appropriate either.

**HINT:** Look at the number of marks (Total for Question 5 is 6 marks) for guidance about the number of points to make.

number			
5	<p>B1</p> <p>Comments on data collection:</p> <ul style="list-style-type: none"> <li>• Taking a random sample would mean each test centre in a region had an equal chance/unbiased chance of being selected</li> <li>• Visiting the test centres would take too long / cost too much / isn't practical</li> <li>• It would be quicker / easier / cheaper to collect data from the internet / secondary data</li> <li>• May not be able to get the information required by asking at the test centres</li> <li>• A good idea to ask for data for the same month for each test centre</li> <li>• Should collect data in more than one month</li> <li>• Should include information on sample size</li> <li>• Good to include all of the regions/representative of the regions</li> </ul> <p>B1ft dep for appropriate comment on appropriateness on method of data collection consistent with the observations made.</p> <p>B1</p> <p>Comments on calculations:</p> <ul style="list-style-type: none"> <li>• Use of an average is a good way to represent the waiting time overall for each region.</li> <li>• Claire should specify which average she plans to use.</li> <li>• Calculating the mean/median of each region.</li> <li>• Mode would not be a suitable average to use.</li> <li>• The range would give an idea of the spread of waiting times within each region.</li> </ul> <p>B1ft dep for appropriate comment on appropriateness on calculations consistent with the observations made.</p>	<p>B1 for a correct comment relating to the methods of data collection</p> <p>B1ft for comment on appropriateness of data collection consistent with their observations Dependent on previous B mark being awarded for data collection</p> <p>B1 for a correct comment relating to the calculations</p> <p>B1ft for comment on appropriateness of calculations consistent with their observations Dependent on previous B mark being awarded for calculations</p>	(6)

	<p>B1</p> <p>Comments on diagrams:</p> <ul style="list-style-type: none"> <li>• A bar chart would make it easier to <u>compare</u> the average waiting times for the different areas.</li> <li>• A bar chart is not suitable for time as it is continuous data.</li> <li>• A histogram or frequency polygon would be better to show continuous data.</li> <li>• A pie chart would not be a suitable way represent the type of data for the range of waiting times for the different areas.</li> </ul> <p>B1ft dep for appropriate comment on appropriateness on diagrams consistent with the observations made.</p>	<p>B1 for a correct comment relating to the diagrams</p> <p>B1ft for comment on appropriateness of diagrams consistent with their observations Dependent on previous B mark being awarded for diagrams</p>	
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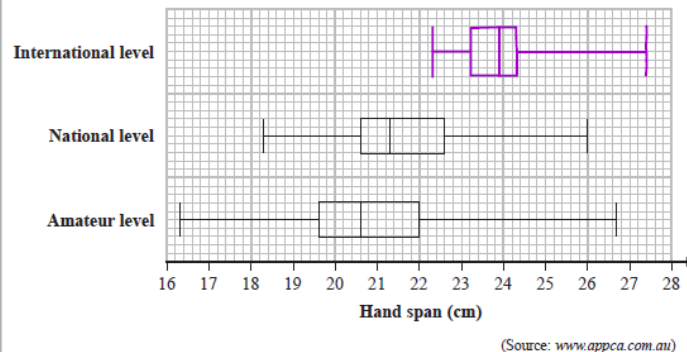
# Foundation P2 Q11

B1f B1f B1f B1f B1f		(22.3, 23.2, 23.9, 24.3, 27.4)
Comparison	Interpretation	
International greatest <u>median</u> or International <u>median</u> > national <u>median</u> > amateur <u>median</u>	e.g. International pianists have the largest/wider (hand spans). As they increase in standard the hand spans increase.	B1f Correct comparison of medians B1f Correct comparison of spread (IQR or range) B1f Correct comparison of skew B1f One correct interpretation
Amateur has the greatest <u>IQR</u> or International <u>IQR</u> < national <u>IQR</u> < amateur <u>IQR</u> or Amateur has the greatest <u>range</u> or	e.g. International pianists have are the most consistent	B1f One further correct comparison of spread or interpretation Allow equivalent/converse statements but underlined words must be seen.

International <u>range</u> < national <u>range</u> < amateur <u>range</u>		Allow for comparison of just two box plots e.g. national and amateur May be multiple comments in one statement. Follow through from their box plot.
All three have <u>positive skew</u> or International <u>negative skew</u> , national and amateur <u>positive skew</u>	e.g. All three have more varied (hand spans) above median	Note: in this question ignore any numerical values in comparisons.

- 11 Some researchers investigated the hand span, in centimetres, of adult pianists by their level – international, national and amateur.

The box plots below give information about the hand spans for national level and amateur level pianists.



- (a) Circle the word in the list below that describes hand span, in centimetres, as a type of data.

qualitative      ordinal      continuous      bivariate

(1)

The table gives information about the hand spans of the international level pianists.

Greatest hand span	27.4 cm
Median hand span	23.9 cm
Lower quartile	23.2 cm
Range	5.1 cm
Interquartile range	1.1 cm

$$23.2 + 1.1 = 24.3$$

- (b) Using the information in the table, draw on the grid above a box plot for the hand spans of the international level pianists.

(3) ✓

- (c) Compare the three distributions of hand spans.  
Give **three** comparisons and interpret **two** of your comparisons.

e.g. Pianists at International have the highest median which means, on average they have the largest hand spans.

The pianists at International level have the smallest IQR so they have more consistent hand spans.

All three have positive skew, so have more varied hand spans above the median than below the median.

(5)

Pavel owns a music shop.  
He wants to investigate the keyboard sizes used by pianists with different hand spans.  
He collects data about the hand spans of the pianists who use his shop.

The table gives information about the number of these pianists with hand spans in each of four size categories.

Hand span (cm)	A (less than 19)	B (19 ≤ span < 22)	C (22 ≤ span < 24)	D (24 or more)
Number of pianists	24	65	57	14

$$\frac{24}{160} \times 20 = 3 \quad \frac{65}{160} \times 20 = 8.125 \quad \frac{57}{160} \times 20 = 7.125 \quad \frac{14}{160} \times 20 = 1.75$$

Pavel plans to sample 20 of these pianists stratified by hand span size.

- (d) Explain how Pavel can obtain his stratified sample.  
You should include details of any calculations he should use.

• By taking 3 from A, 8 from B, 7 from C and 2 from D.

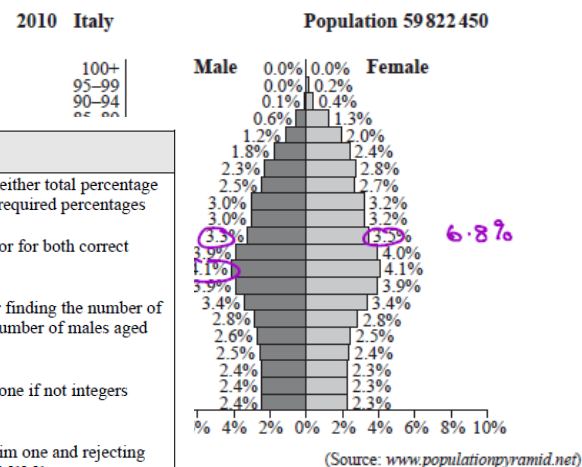
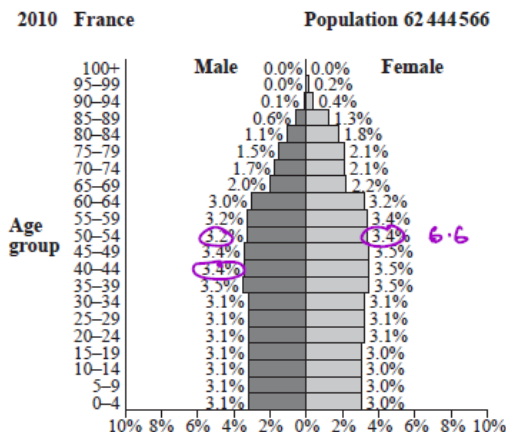
• There should be a random sample, for example all the pianists within each strata could be labelled and using a random number generator to select the appropriate number of pianists.

(3)

(Total for Question 11 is 12 marks)

# Foundation P1 Q9 and Higher P1 Q3

- The two population pyramids give information about the percentage of the population who are male and who are female for each age group in France and in Italy in 2010



Tommy is investigating how the populations of Italy and France differ in 2010. He uses the two population pyramids to reach the following two conclusions.

- The percentage of people aged 50-54 was lower in France than the percentage of people aged 50-54 in Italy.  $6.6\%$   $6.8\%$
- The number of males aged 40-44 in France was greater than the number of males aged 40-44 in Italy.  $4.1$   $3.4$

Assess Tommy's two conclusions.

You should show clearly the value of any statistics you use in your answer.

$$3.2 + 3.4 = 6.6$$

$$3.8 + 3.5 = 6.8$$

40-44 males in France  $3.4\%$

$$0.034 \times 62\,444\,566 = 2\,123\,115.244$$

males in Italy  $4.1\%$

$$0.041 \times 59\,822\,450 = 2\,452\,720.45$$

Claim 1 is correct.

The percentage of people aged 50-54 is lower in France than in Italy  $6.6 < 6.8$

Claim 2 is incorrect.

The number of males aged 40-44 in France is not greater than in Italy.

Answer		Additional guidance
M1 $3.2 + 3.4 = (6.6)$ or $3.3 + 3.5 = (6.8)$	M1 for identifying (France) 3.2, 3.4 AND (Italy) 3.3, 3.5	M1 for attempt at finding either total percentage or for identifying all four required percentages
A1 for 6.6 and 6.8	A1 for $3.2 < 3.3$ AND $3.4 < 3.5$	A1 for both correct totals or for both correct comparisons
M1 for $0.034 \times 62\,444\,566 = (2\,123\,115.244)$ or $0.041 \times 59\,822\,450 = (2\,452\,720.45)$		M1 for correct method for finding the number of males aged 40-44 or the number of males aged 40-44 in Italy
A1 for 2 123 115 and 2 452 720		A1 for both correct. Condone if not integers
dep B1ft Claim one is correct / the percentage of 50-54 is greater in Italy compared to France. AND claim two is incorrect / the number of males aged 40-44 is greater in Italy compared to France.		dep B1ft for accepting claim one and rejecting claim two. Dependent on M1M1



# Higher P2 Q8

- 8 Roxann wants to investigate the resting heart rates for members of her running club. She believes that the resting heart rates will be normally distributed. Here is the plan for her investigation.

## Data collection

Take a census of the 110 members of the running club (50 female runners and 60 male runners).

Each runner will measure their resting heart rate and input the information into the spreadsheet when they come to the club.

## Processing and presenting data

Construct a box plot for the resting heart rate of the male runners and a box plot for the resting heart rate of the female runners.

Work out the mean, median and mode for the resting heart rate of the male runners and for the resting heart rate of the female runners.

Work out the standard deviation for the resting heart rate of the male runners and for the resting heart rate of the female runners.

Discuss whether Roxann's plans for collecting and presenting data are **appropriate**.

## DATA COLLECTION

eg It is **not appropriate** for the runners to be measuring their own heart rates as there will be no control over extraneous variables such as time of day etc. However it is **appropriate** to take measurements when they come to the club.

## PROCESSING AND PRESENTING

eg Constructing box plots and averages for male and female is **appropriate** to allow Roxann to ascertain if there are any differences between the genders. Whilst a box plot allows you to see if the data is distributed symmetrically, a histogram would tell us if the distribution is bell shaped.

Using mean, median and mode is **appropriate** as they should be equal for data that is normally distributed.

Working out SD is **appropriate** because for normally distributed data approximately 95% of the data lies within 2 standard deviations of the mean so Roxann could check this too.

(Total for Question 8 is 6 marks)

Answer	Additional guidance	Mark
<p>B1 for each of six correct comments.  <b>Maximum 3 marks for data collection. Maximum 3 marks for processing and presenting data.</b></p> <p><b>Data collection:</b></p> <ul style="list-style-type: none"> <li>• Suitable sample size as it is large/representative as it includes all the members of the running club.</li> <li>• Runners measuring their own heart rates may lead to errors/inconsistency's/runners may lie about their heart rates/Roxann should measure the heart rates.</li> <li>• Some runners may not take part/forget to add it on the spreadsheet.</li> <li>• Data may need cleaning</li> <li>• Entering results on a spreadsheet means it will be quicker to do calculations</li> <li>• Appropriate for the runners to measure their heart rate when they come to the club.</li> <li>• She should also ask runners to record their gender on the spreadsheet.</li> <li>• (Runners measuring their own heart rates means that there is) no control over extraneous variables e.g. time of day, caffeine consumption</li> </ul>	<p>B1 for each correct comment on the appropriateness of the plans for data collection, process and presenting data.</p> <p>Do not accept: number of female and male runners differ. Each bullet point can be awarded once only.</p> <p>Comments about appropriate/not appropriate alone are not sufficient. There needs to be a correct reason.</p>	(6)

## Processing and presenting data:

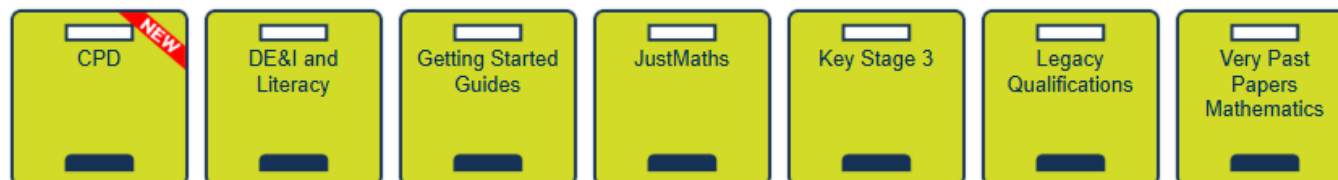
- Separating male and female data is sensible as there may be a difference between the sexes
- A histogram would be better than a box plot to (show the shape of the distribution)
- A box plot would allow you to see if the data is symmetrically distributed/see the spread of the distribution
- A **histogram** would allow you to see if the distribution is bell shaped
- Mean, median and mode would be expected to be equal for normally distributed data
- Mean and median would allow her to calculate the skew.
- Working out the (mean and) standard deviation would be appropriate for deciding if the distribution is normal.
- For normally distributed data approximately 95% of data lies within 2 standard deviations of the mean or 68% of data lies within one standard deviation of the mean or almost all data is within 3 standard deviations of the mean - calculating mean and standard deviation allows for this to be checked

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## Additional Support



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### UPCOMING EVEN

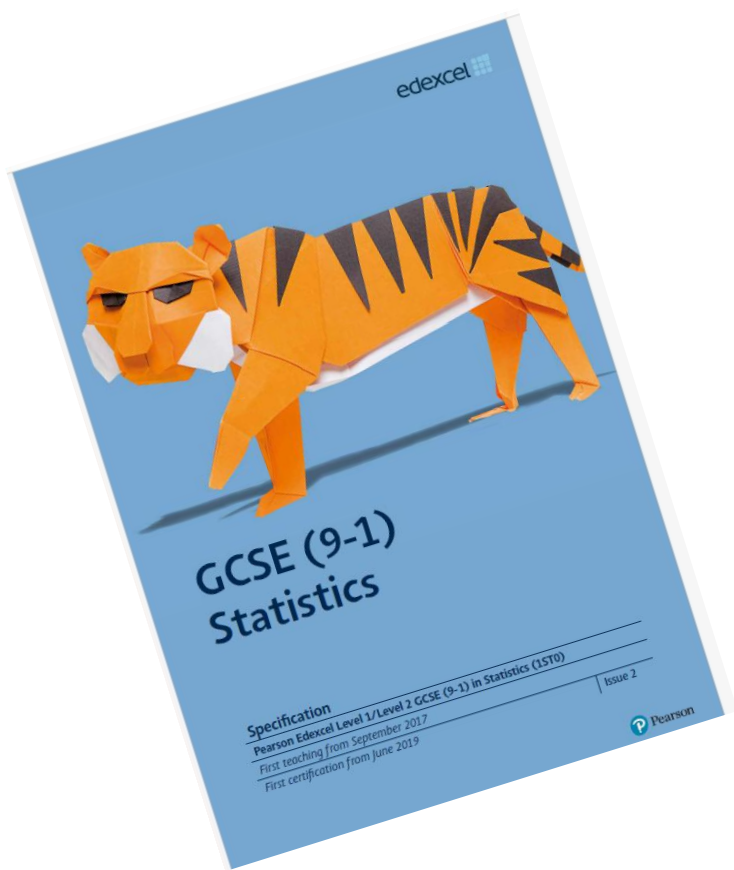
DEC All day  
**10** GCSE Maths  
Mark schem

DEC 4:00 pm - 5:00  
**10** GCSE Statis  
Lower Perfo  
Online Netw

DEC All day  
**11** Maths in Co  
Marking Gui

DEC All day  
**16** GCSE Maths

# Statistical Enquiry Cycle



Any given question may assess one stage of the *statistical enquiry cycle* or more than one stage of the statistical enquiry cycle. For example, please see the *Pearson Edexcel Level 1/Level 2 GCSE (9-1) in Statistics Sample Assessment Materials (SAMs)* document – Foundation Paper 1 Question 11 and Higher Paper 1 Question 2.

## Statistical enquiry cycle

The order of the content, for each tier, follows the order of the **statistical enquiry cycle**. It is important that practical investigations are part of a programme of study so that students have the opportunity to understand that different approaches, including the use of technology, may be appropriate at each stage of the statistical enquiry cycle, and that statistical conclusions are developed through an iterative process of testing and refinement.

1. Through using the statistical enquiry cycle students need to understand the **importance of initial planning** when designing a line of enquiry or investigation, including:
  - defining a question or hypothesis (or hypotheses) to investigate
  - deciding what data to collect and how to collect and record it giving reasons
  - developing a strategy for how to process and represent data giving reasons.
2. Through using the statistical enquiry cycle students need to be able to recognise the **constraints involved in sourcing appropriate data**, including:
  - when designing collection methods for primary data
  - when researching sources for secondary data, including from reference publications, the internet and the media
  - through appreciating the importance of acknowledging sources
  - by recognising where issues of sensitivity may influence data availability.
3. Through using the statistical enquiry cycle students need to understand **ways that data can be processed and presented**, including:
  - organising and processing data, including an **understanding of how technology can be used**
  - generating diagrams and visualisations to represent the data, including an **understanding of outputs generated by appropriate technology**
  - generating statistical measures to compare data, **understanding the advantages of using technology to automate processing**.
4. Through using the statistical enquiry cycle students need to understand that **results must be interpreted with reference to the context of the problem**, including:
  - analysing/interpreting the diagrams and calculations/measures
  - reaching conclusions that relate to the questions and hypotheses addressed
  - making inferences and/or predictions
  - discussing the reliability of findings.
5. Through using the statistical enquiry cycle students should show an understanding of the importance of **clear and concise communication** of findings and key ideas, and an **awareness of target audience**. They should also understand the importance of **evaluating statistical work**, including:
  - identifying weaknesses in approach or representation
  - suggesting improvements to processes or the presentation
  - refining the processes to elicit further clarification of the initial hypothesis.

# Of course ... the Emporium

Maths Emporium > GCSE Statistics > 08 Practice Papers & Mark schemes

## Category: 08 Practice Papers & Mark schemes

01 Crossover Question Papers

02 Statistical Enquiry Cycle Practice

03 Additional Assessment Materials

04 Themed Papers

05 Papers re-ordered

06 Aiming for

**Pearson Edexcel**  
**Level 1/Level 2 GCSE (9-1)**

**Statistics**  
Statistical enquiry cycle: Practice questions

Foundation Tier

**You must have:**  
Ruler graduated in centimetres and millimetres, protractor, pen, HB pencil, eraser, scientific calculator.

**Instructions:**

- Use **black** ink or ball-point pen.
- Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- Scientific calculators may be used.
- You must **show all your working out** with your answer clearly identified at the **end of your solution**.

**Information**

- The total mark for this paper is 39.
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*

**Advice**

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Answer ALL questions.  
Write your answers in the spaces provided.  
You must write down all the stages in your working.

1 David wants to find out how much money people spend on their gardens. David is going to send questionnaires to a sample of people included in the mailing list of a local garden centre.

(a) Discuss whether or not this is an appropriate method of data collection.

.....

.....

..... (2)

Here is one of the questions that David wants to put on his questionnaire.

A garden is a really important feature of a house, isn't it?

Strongly agree ☐ **agree** ☐ Don't know ☐ Strongly disagree ☐

(b) This is not a suitable question.  
Give **two** reasons why.

.....

.....

..... (2)

Here is another of the questions that David wants to put on the questionnaire.

How much money do you spend on your garden?

£10-20 ☐ £20-30 ☐ £30-50 ☐

(c) Discuss whether or not this is a suitable question for the questionnaire.

.....

.....

..... (2)

(Total for Question 1 is 6 marks)

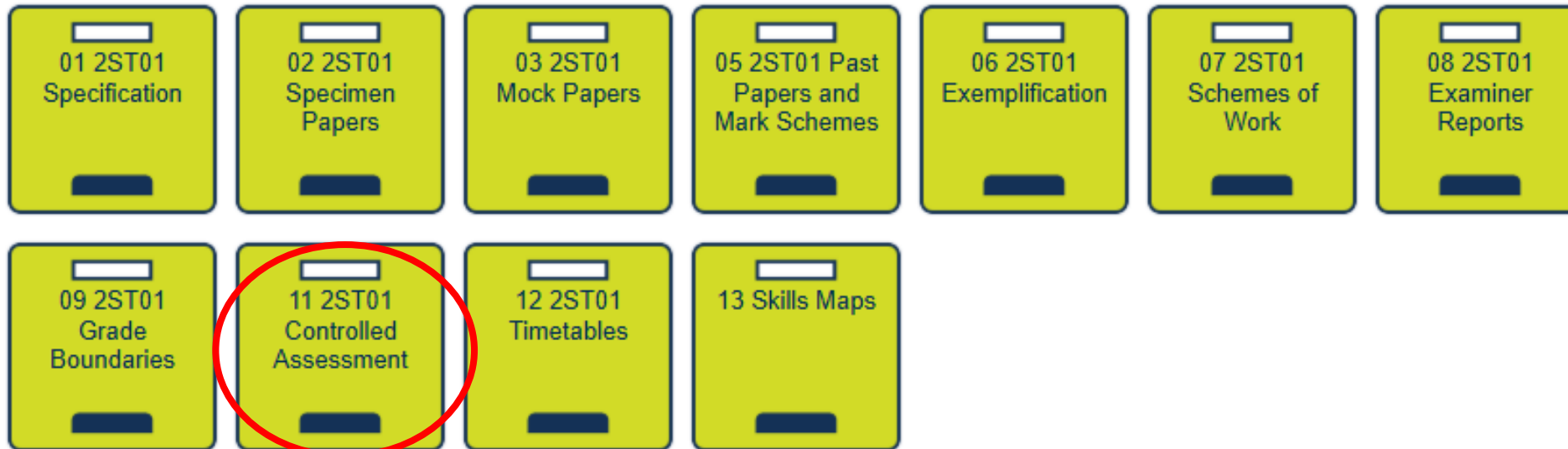
# Of course ... the Emporium

[Maths Emporium](#) > [Legacy Qualifications](#) > [GCSE Statistics](#) > 2ST01 Statistics

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## Category: 2ST01 Statistics

2ST01 Statistics which has been examined since June 2011.





# Maths Emporium – Practice Papers & more

The [Maths Emporium](#) contains a rich source of resources for GCSE Statistics teachers, including:

- [practice papers, including Statistical Enquiry practice and themed papers](#)
- [common question papers](#),
- [past papers, mark schemes, examiner reports](#)
- shadow papers for some of the previous exam series – we've released [\\*New\\* Summer 2024 shadow papers](#)
- [\\*New\\* QLAs](#) (standard and enhanced) for the Summer 2024 exam series
- [Enhanced skills map for foundation and higher](#)
- [\\*New\\* exemplars for Summer 2024](#)

## Category: GCSE Statistics

GCSE Statistics documents for the current 9-1 specification (1ST0)



# New 'Aiming for' Papers for GCSE Statistics

[Maths Emporium](#) > [GCSE Statistics](#) > 08 Practice Papers & Mark schemes

## Category: 08 Practice Papers & Mark schemes



Please check the examination details below before entering your candidate information

Candidate surname	Other names
-------------------	-------------

Centre Number	Candidate Number
---------------	------------------

**Pearson Edexcel Level 1/Level 2 GCSE (9–1)**

**AIMING FOR GRADE 4 (2024)**

Paper reference	<b>1ST0/1F</b>
-----------------	----------------

**Statistics**  
**PAPER 1**  
**Foundation Tier**

**You must have:**  
Ruler graduated in centimetres and millimetres, protractor,  
pair of compasses, pen, HB pencil, eraser, scientific calculator.

Total Marks

Please check the examination details below before entering your candidate information

Candidate surname	Other names
-------------------	-------------

Centre Number	Candidate Number
---------------	------------------

**Pearson Edexcel Level 1/Level 2 GCSE (9–1)**

**AIMING FOR GRADE 7 (2024)**

Paper reference	<b>1ST0/1H</b>
-----------------	----------------

**Statistics**  
**PAPER 1**  
**Higher Tier**

**You must have:**  
Ruler graduated in centimetres and millimetres, protractor,  
pair of compasses, pen, HB pencil, eraser, scientific calculator.

Total Marks

# Other support





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## Pearson Edexcel Facebook Page

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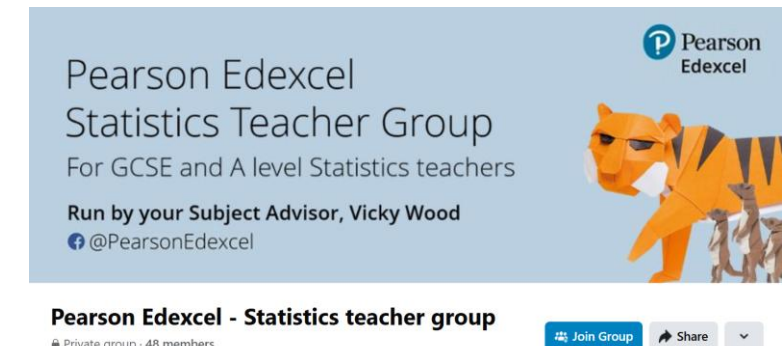
Click [here](#) to find our page, or scan this code



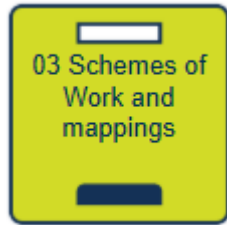
## Facebook Teacher Groups

Be sure to also join our Pearson Edexcel Statistics Teacher group on Facebook. Created to give Statistics teachers a private, professional space to have discussions. The group is managed by your Subject Advisor.

Click [here](#) to join the group, or scan this code



# New Schemes of Work for GCSE Statistics



Our subject advisor Vicky has created new versions of our schemes of work for GCSE Statistics to make it as straight forward and easy as possible for you to deliver this qualification.

They give you all the information you need to plan how you will deliver this course, including mappings to GCSE Maths.

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GCSE (9-1) Statistics - Foundation Tier				GCSE (9-1) Mathematics - Foundation Tier			
GCSE STATISTICS CHAPTER / LESSON	HOURS	GCSE STATISTICS SPEC REFERENCE	GCSE STATISTICS OBJECTIVES	GCSE STATISTICS GUIDANCE	GCSE MATHS CHAPTER / LESSON	GCSE MATHS SPEC REFERENCE	GCSE MATHS OBJECTIVES
1 - Collection of data	20	1a, 1b, 1c, 1d, 2h	Know and apply terms used to describe different types of data that can be collected for statistical analysis: raw data, quantitative, qualitative, categorical, ordinal, discrete, continuous, ungrouped, grouped, bivariate.	Use of correct statistical terminology to describe given data is expected. Know that more than one term may be appropriate. Identification of variables relevant to an investigation or hypothesis is expected.	Book 1 3 - Graphs, tables and charts	3.1 - Frequency tables	Interpret and construct ... for ungrouped discrete numerical data
1.1 Describing data	1	1b.01			Book 1 3 - Graphs, tables and charts	3.1 - Frequency tables	construct and interpret diagrams for grouped discrete data and continuous data, ...
1.2 Grouping data	1	1b.02	Know the advantages and implications of merging data into more general categories, and of grouping numerical data into class.	Expected to know class width, and implications of grouping data, e.g. loss of accuracy in both calculations and presentations.	Book 1 3 - Graphs, tables and charts	3.1 - Frequency tables	construct and interpret diagrams for grouped discrete data and continuous data, ...
1.3 Primary and secondary data	1	1b.04	Know the difference between primary and secondary data.	Including advantages and disadvantages of each. Consideration of the reliability and accuracy of the data (including issues of rounding) and the recognition of possible constraints in accessing	Book 1 7 - Averages and range	7.5 - Sampling	Infer properties of populations or distributions from a sample, while knowing the limitations of sampling
1.4 Populations	1	1c.01	Know the difference between population, sample frame and sample.	Identify a population, and suggest a suitable sampling frame	Book 1 7 - Averages and range	7.5 - Sampling	Infer properties of populations or distributions from a sample, while knowing the limitations of sampling
1.6 Random sampling	2	1c.02	Know that 'population' can have different meanings within a stated context.	For example, all employees in an office; all females in the UK; all items produced in a	Book 1 7 - Averages and range	7.5 - Sampling	Infer properties of populations or distributions from a sample, while knowing the limitations of sampling
		1c.04	Know appropriate sampling techniques in the context of the problem to avoid bias. Understand random, systematic, and quota sampling.	Including advantages and disadvantages of each technique. e.g. Know that systematic and quota sampling techniques are generally non-random. Know that the period of systematic sampling may coincide with a period occurring in the data			
		1c.05	Know the key features of a simple random sample and demonstrate understanding of	Be aware that all items in the population should have the same likelihood of inclusion in			

# Contact us

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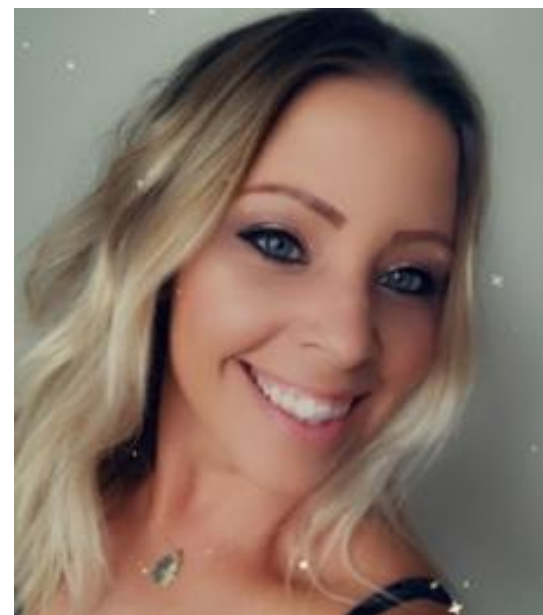
JustMaths

# Meet your Maths and Statistics Subject Advisor and Partner



**Vicky Wood**

Vicky works closely with the wider maths team to support teachers in UK centres in delivering Pearson Edexcel qualifications in Mathematics and Statistics [teachingmaths@pearson.com](mailto:teachingmaths@pearson.com)  
[Sign up for Vicky's monthly updates](#)



**Nicola Woodford-Smith**

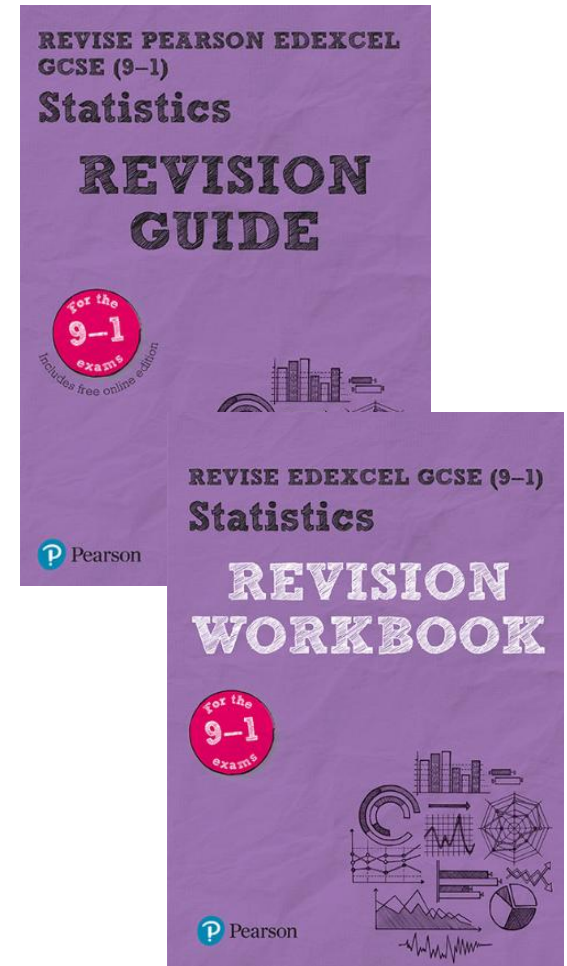
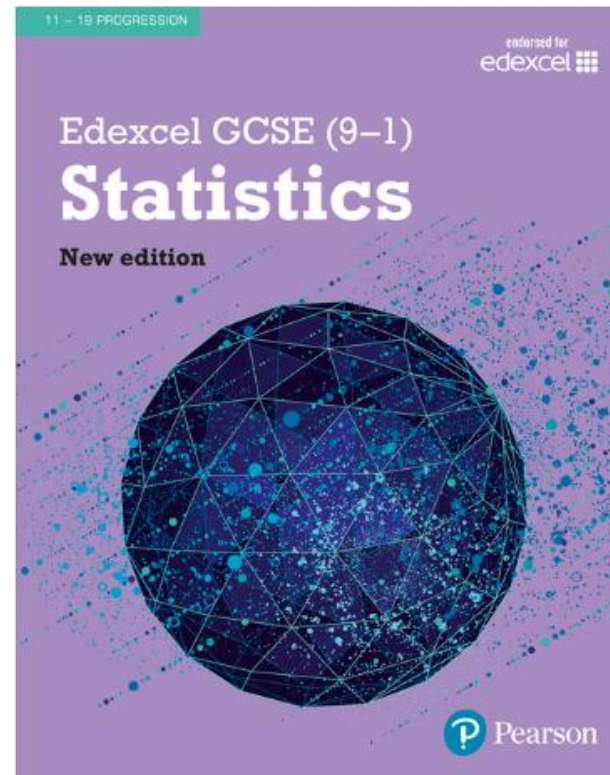
Nicola works as the maths Subject Partner in the maths team at Pearson Edexcel. She helps to create resources and delivers CPD to support you and your team through the lifecycle of our qualifications.

Follow [@miss\\_mathsgeek](#) (on X) for updates and information

# GCSE Statistics – Published Resources to support delivery

- Developed in line with the key principles of the specification
- Student Book covers both Higher and Foundation Tier – also as an ebook
- Plenty of real-life statistics in every unit to bring the subject to life and highlight important applications
- Fully aligns with the Pearson Edexcel scheme of work
- Helps students prepare for exams

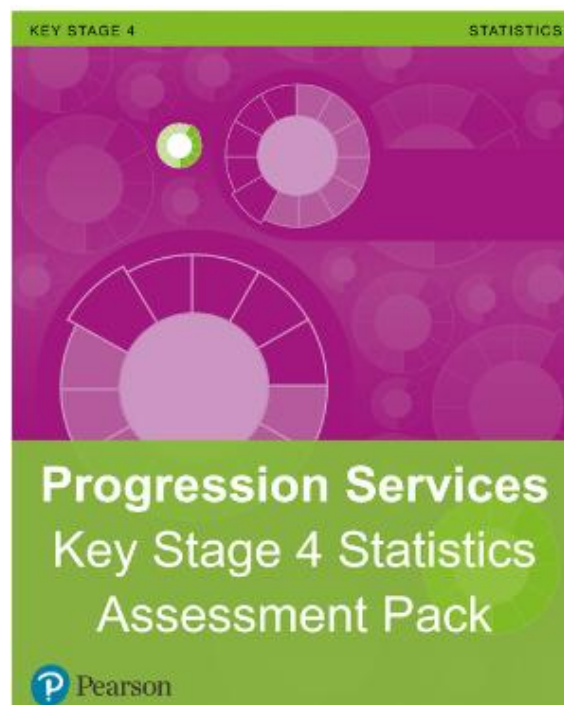
[Find out more on the Pearson Schools and Colleges Website](#)





# GCSE Statistics – Published Resources to support delivery

Pearson Progress & Assess for GCSE Statistics provides a consistent method of tracking student progress across the subject, as well as providing a front-of-class version of the student book. We enable teachers to assess, track and report on progression providing you with in-depth reporting.



- **Front-of-class e-book** version of the student book\*
- **Progression Map** with a link to indicative grades
- **2 baseline tests** (one for a two-year scheme of work and one for a one-year scheme of work)
- **15 end-of-unit tests** based on the Edexcel scheme of work
- **2 end of year tests** (end of year 1 of two-year scheme of work for Foundation and Higher)
- **4 end of course tests** (two for Foundation and two for Higher)

\*Soon to be available on ActiveHub



# NEW Level 2 Extended Maths Certificate



Level 2  
Extended  
Maths  
Certificate

Giving students the **opportunity to challenge** themselves at Key Stage 4 and build the **perfect foundation** for further study.

Scan the QR code or [use this link](#) to **register your interest** and to find out more.

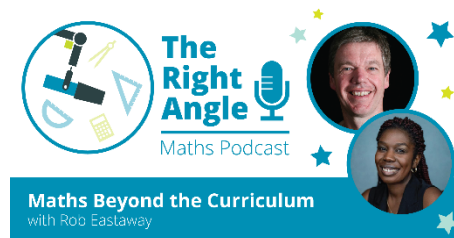
You can also find the [recordings](#) of our launch event and Getting Ready to Teach event on the Maths Emporium.



# NEW Podcast: The Right Angle



The Right Angle invites topical discussions, debates and insights from a range of thought leaders, award-winning maths educators and facilitators. Our subject partner hosts, Mark Heslop and Nicola Woodford-Smith lead conversations on themes such as the evolution of technology to support learning, student engagement and diversity and inclusion across the education of mathematics. Listen and subscribe for FREE on Apple Podcasts, Spotify and on Soundcloud.

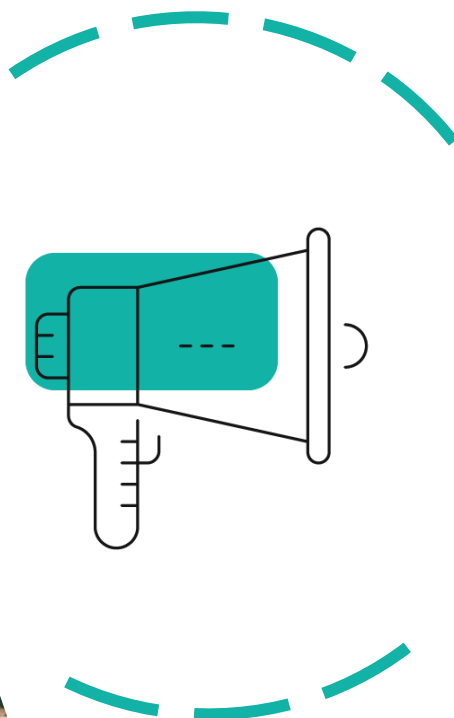




# Find out more

For more professional development courses please see Pearson's [Professional Development Academy](#)





# Your Feedback Matters

Following this event, you will receive an invitation to share your thoughts about the session. Your feedback is invaluable to us, as it helps us tailor our professional development materials to better meet your needs. Please don't hesitate to let us know what you'd like to see more of and what areas you think could be improved.





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