

Mathematics
Additional Question Bank
Intermediate 1

5844

September 1999

HIGHER STILL

Mathematics

Additional Question Bank

Intermediate 1

Support Materials



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1. INTRODUCTION

1.1 Background

The National Courses in Mathematics at Intermediate 1 and Standard Grade General Level are equivalent in standard with a high percentage of common content. This Bank of Additional Questions for Intermediate 1 Mathematics consists mainly of questions taken from the SCE Mathematics Standard Grade Examination Papers at General Level for the years 1994 to 1999. Through the question paper moderation procedures of the Scottish Examination Board (SEB) (now Scottish Qualifications Authority (SQA)), the past paper questions in the Bank have already undergone scrutiny for clarity of language and mathematical accuracy. In addition, the difficulty levels attached to the questions are based on actual examination performance by candidates and the experience of examiners. Both of these factors have facilitated the speedy construction of an initial Bank of valid and reliable assessment instruments for the Intermediate 1 Mathematics course consisting of Mathematics 1(Int 1), Mathematics 2(Int 1) and Mathematics 3(Int 1). The statistical questions provided for Outcomes 4 and 5 in Mathematics 2 (Int 1), which have no Standard Grade equivalent, come from a variety of sources and have undergone careful selection and scrutiny.

1.2 Structure and purpose

The structure of the Bank is such that questions from future examinations for Intermediate 1 Mathematics and from other sources available to users can be categorised similarly and added to the Bank to allow for the construction of more tests with minimal repetition of questions.

The purpose of the Bank is to prepare students for course assessment and to generate evidence of attainment beyond the minimum competence necessary to pass the unit assessments for Intermediate 1 Mathematics. Centres are required to submit estimates of the bands candidates are likely to attain in the external course assessment and to retain the evidence of attainment on which estimates are based for use in the event of appeals. Following the guidelines below and using questions from this bank to obtain an assessment of the candidate's own unaided work should provide quality evidence of an estimate band. Centres may, of course, prefer to devise their own assessment materials, in which case modifying questions from the Bank or creating new questions based on contexts used in questions in the Bank may be helpful.

1.3 Quality of evidence

For assessment evidence in the form of prelim examinations or any other form of evidence to be fit for the purposes of estimates and appeals it is important that it covers as much of the course as possible. In Mathematics, evidence will normally be produced under supervision to ensure that it is the candidate's own unaided work. The following specification, which approximates to that used by SQA in the construction of the external assessment for Intermediate 1 Mathematics, is offered as a guide for the construction of internal course assessments in terms of breadth, depth and variety of assessment instruments.

Breadth: Maths 1(Int 1): Maths 2(Int 1): Maths 3(Int 1) or Appl (Int 1): cgd.

In assessment evidence, approximately 30% of the available marks should be allocated to questions or parts of questions based on the content of each unit with the remainder, approximately 10%, allocated to questions or parts of questions which meet the course grade descriptions (cgd) for Intermediate 1 Mathematics.

Approximately 20% of the available marks should be embedded in questions which integrate across the above categories.

Depth: grade C marks: grade A/B marks

In assessment evidence, approximately 60% of the available marks should be accessible to candidates capable of achieving a C grade in the external examination. The attainment of marks allocated to the A/B category is a good indication of a high level of mathematical ability. However it should be noted that the categorisation of C and A/B marks is intended to be used mainly for the construction of assessments. Judgements of ability can be arrived at on the basis of the total marks obtained by candidates on assessments of appropriate depth and duration. Evidence used for appeals purposes must be clearly supporting a grade i.e. A, B or C.

Variety of assessment instruments:

(a) non-calculator & calculator neutral: calculator & calculator neutral

The SQA Intermediate 1 Mathematics Specimen Question Paper I, in which calculators may not be used, contains questions which assess knowledge and skills that candidates should be able to demonstrate without the aid of a calculator. In Intermediate 1 Mathematics, for example, some questions assessing basic algebraic manipulation or of a graphical nature come into this category. Some questions in Paper 1 will require candidates to demonstrate non-calculator numerical skills as set out in the SQA National Course Specification for Intermediate 1 Mathematics. Additional questions of a calculator neutral variety top up the total marks available to 32 with a time allocation of 35 minutes.

Specimen Question Paper II, in which calculators may be used, contains those questions where a calculator is required, for example, to obtain numerical values of trigonometric ratios and to carry out numerical calculations beyond the level specified for the Non-calculator Paper. Additional questions of a calculator neutral variety top up the total marks available to 46, with a time allocation of 55 minutes.

Assessment evidence need not conform exactly to this pattern, but it is important that non-calculator skills and the ability to perform sustained work are assessed.

(b) routine : non-routine

Similar to the questions used to assess the Knowledge and Understanding and the Reasoning and Enquiry elements used in Standard Grade Mathematics, there are assessment questions at Intermediate 1 which are of a routine nature and others of a non-routine nature. The routine questions assess the candidate's ability to carry out routine procedures and demonstrate knowledge

and understanding of basic facts and concepts. The non-routine questions require the candidate to demonstrate the ability to make decisions and apply knowledge and understanding to problem solving where the strategy is not obvious.

Across the two SQA Intermediate 1 Mathematics Specimen Papers, approximately 55% of the available marks are in questions or parts of questions which fit the routine category. The remaining marks, approximately 45%, are in non-routine questions.

Internal assessment evidence should have an approximately corresponding proportion of the marks embedded in non-routine questions.

1.4 Bank codes

In the following sections of this Additional Question Bank, codes are used for ease of reference. Mathematics 1(Int 1), Mathematics 2(Int 1), Mathematics 3(Int 1) and Applications of Mathematics (Int 1) are referred to as Unit 1, Unit 2, Unit 3 and Unit 4 respectively. A 3-figure code has been applied to the items of course content as listed in the National Course Specification for Intermediate 1 Mathematics. For example, 2.1.4 is the reference to the fourth item of content in the first outcome of unit 2. A code 0.1 has been used to classify content which falls into the category of course grade descriptions. In some instances there is no content item statement which exactly describes the mathematical activity being assessed and in such cases a related statement is used. For example, 1.2.2, find the volumes of cubes and cuboids also covers the situation where the volume is given and a dimension is to be found. Section 2 contains the full list of coded content for Intermediate 1 Mathematics in an abbreviated form. The document, SQA Mathematics Intermediate 1 :National Course Specification should be consulted for a full statement of course content and comment and the course grade descriptions.

1.5 Additional questions

Section 3 of the Bank contains an analysis of the questions in grid form. Headings and abbreviations are explained on page 4.

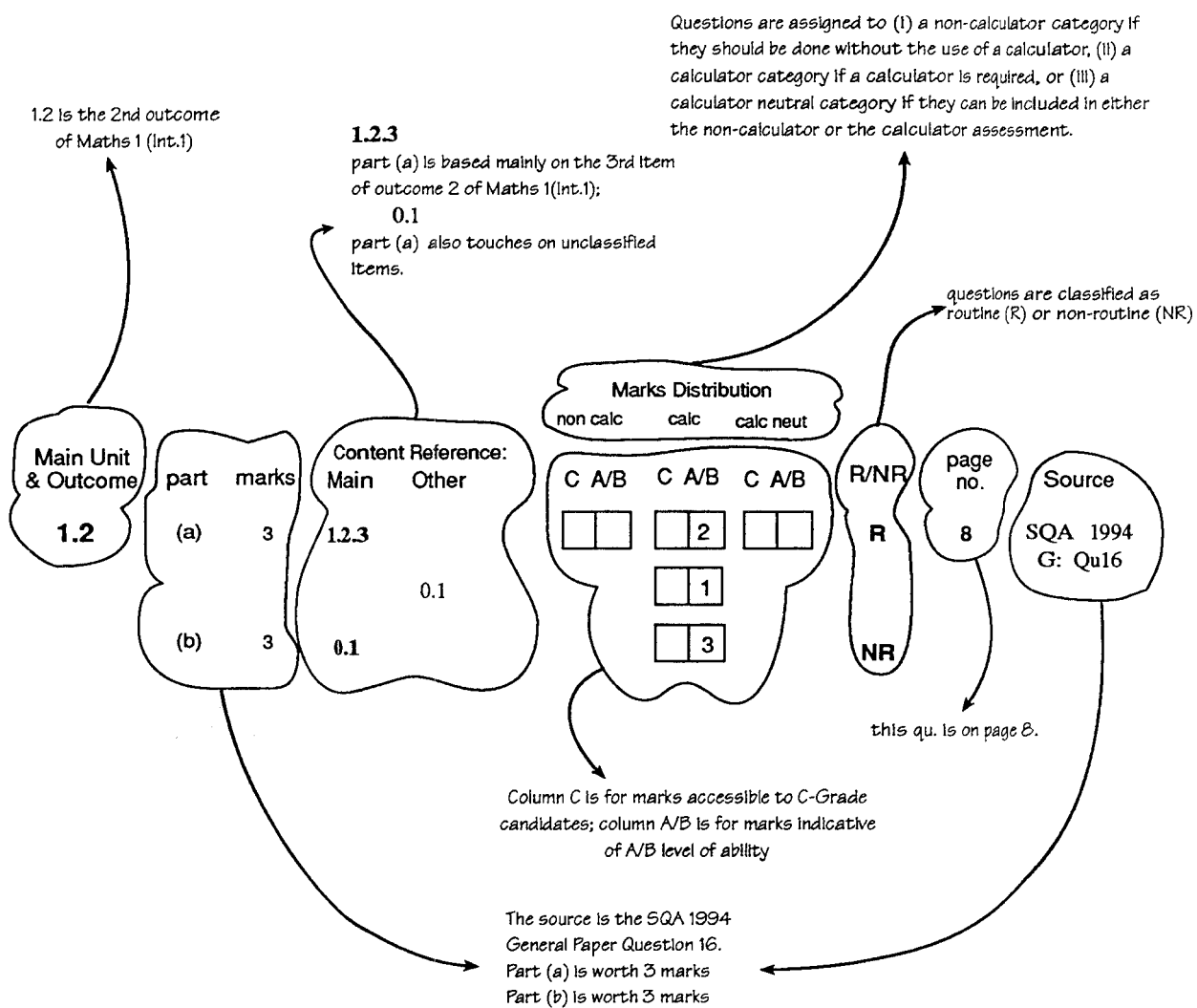
Section 4 lists each of the questions with, as a guide to marking, a simplified version of the actual marking instructions used in the examinations. Only one method of marking is illustrated and it should be noted that, in many instances, alternative methods are equally valid.

1.6 Important limitations on use of the initial Bank

(i)The questions in this initial Bank were not constructed to satisfy the non-calculator external assessment arrangements which now apply. Consequently some questions which have been allocated a calculator neutral status may involve a level of computation higher than would normally be expected for inclusion in non-calculator papers. Users of the Bank can take account of this by minor alterations to such a question or by amending the marking scheme.

(ii)Since past examination papers for Standard Grade General Level Mathematics are in the public domain, it is important, for reliability, that internal course assessments are constructed with questions across the spread of years. For example, for an internal course assessment modelled on the Specimen Papers, a maximum of 3 questions should be selected from the General Level Paper for any year. Whilst the Bank is

relatively small, minor changes to questions, which do not change the characteristics of the question in terms of its analysis or level of difficulty should be considered.



SECTION 2

CONTENT REFERENCE LIST

Unit 1 Outcome 1**1.1 Basic calculations**

- 1.1.1 find a percentage of a quantity
(calculate interest for fraction of a year)
- 1.1.2 **express one quantity as a percentage of another**
round calculations to a given degree of accuracy:
- 1.1.3 • to nearest whole number
- 1.1.4 • to nearest 10, 100, 1000
- 1.1.5 • to a given number of decimal places
- 1.1.6 solve simple problems on direct proportion

Unit 1 Outcome 2**1.2 Basic geometric properties**

- 1.2.1 find the areas of simple composite shapes
(simple composite shapes including semi-circles)
- 1.2.2 find the volumes of cubes and cuboids
- 1.2.3 find the area and circumference of a circle

Unit 1 Outcome 3**1.3 Expressions and formulae**

- 1.3.1 evaluate expressions
- 1.3.2 evaluate formulae expressed in words
- 1.3.3 evaluate simple formulae expressed in symbols

Unit 1 Outcome 4**1.4 Calcs in everyday contexts**

- 1.4.1 carry out calculations involving money in appropriate social contexts
use exchange rates to convert from:
- 1.4.2 • pounds sterling to foreign currency
- 1.4.3 • **foreign currency to pounds sterling**

Unit 2 Outcome 1**2.1 Integers**

- 2.1.1 plot and read coordinates in all four quadrants
- 2.1.2 add and subtract positive and negative integers
(subtract a negative integer from an integer)
- 2.1.3 multiply two integers where one is positive and one is negative and divide a negative integer by a positive integer
- 2.1.4 **multiply and divide two integers where both are negative and multiply three or more integers**

Unit 2 Outcome 2**2.2 Speed, distance and time**

- 2.2.1 interpret distance–time graphs
- 2.2.2 recognise the significance of the point of intersection of two graphs, where the graphs are in context
- 2.2.3 calculate time intervals, including those over midnight or midday on the 12-hour clock
- 2.2.4 distance, speed, time – calculate one, given the other two

Unit 2 Outcome 3**2.3 The Theorem of Pythagoras**

- 2.3.1 solve problems in right-angled triangles using the Theorem of Pythagoras

Unit 2 Outcome 4**2.4 Simple graphs, charts, tables**

- 2.4.1 extract and interpret data from bar graphs, line graphs, pie charts and stem-and-leaf diagrams
- 2.4.2 construct bar graphs, line graphs and stem-and-leaf diagrams
- 2.4.3 interpret trends in graphs
- 2.4.4 construct a frequency table from data without class intervals
- 2.4.5 construct and interpret a scattergraph
- 2.4.6 draw a best-fitting straight line by eye on a scattergraph and use it to estimate the value of one variable given the other

Unit 2 Outcome 5**2.5 Use of simple statistics**

- 2.5.1 calculate the mean, median, mode and range from a data set
- 2.5.2 calculate the mean, median, mode and range of data presented in an ungrouped frequency table
- 2.5.3 **interpret calculated statistics**
- 2.5.4 state the probability of a simple outcome

Unit 3 Outcome 1**3.1 Simple algebraic operations**

- 3.1.1 evaluate formulae expressed in symbols
manipulate algebraic expressions involving brackets
- 3.1.2 • multiply expressions
- 3.1.3 • remove brackets and collect like terms
- 3.1.4 factorise expressions – common factor
- 3.1.5 solve simple linear equations
($\frac{1}{3}x = 7$, $x + 7 = 4x - 5$)
- 3.1.6 solve simple inequalities

Unit 3 Outcome 2**3.2 Graphical relationships**

- 3.2.1 know the equation $y = ax + b$ as the equation of a straight line
- 3.2.2 draw a straight line given its equation in the form $y = ax + b$ by drawing up a table of values

Unit 3 Outcome 3**3.3 Trig. in a right-angled triangle**

- 3.3.1 solve right-angled triangles using sine, cosine and tangent

Unit 3 Outcome 4**3.4 Standard form (scientific notation)**

- 3.4.1 interpret index notation, 10^n , as used in standard form
- 3.4.2 rewrite large and small numbers using standard form
- 3.4.3 interpret calculator display
- 3.4.4 perform simple calculations using standard form

SECTION 3

QUESTION ANALYSIS

Main Unit & Outcome	part	marks	Content Main	Reference : Other	marks distribution						R/NR	page no.	Source
					non calc		calc		calc neut				
					C	A/B	C	A/B	C	A/B			
0.1	(a)	1	0.1					1		NR	1	SQA 1994	
	(b)	2	0.1					2		NR		General Qu.2	
	(c)	2	0.1					2		NR			
0.1	(a)	3	0.1			2	1			NR	3	SQA 1994	
	(b)	3	0.1					3		NR		General Qu.4	
0.1	(a)	2	0.1			2				NR	5	SQA 1994	
	(b)	3	0.1				3			NR		General Qu.10	
0.1	(a)	1	0.1					1		NR	10	SQA 1994	
	(b)	4	0.1						4			General Qu.19	
0.1	.	2	0.1					2		R	12	SQA 1995 General Qu.3	
0.1	(a)	3	0.1					2	1	NR	12	SQA 1995	
	(b)	1	0.1						1	NR		General Qu.4	
0.1	(a)	2	0.1			2				R	13	SQA 1995	
	(b)	3	0.1				3			NR		General Qu.6	
	(c)	3	0.1				3			NR			
0.1	.	4	0.1					4		NR	20	SQA 1996 General Qu.5	
0.1	.	3	0.1						3	NR	22	SQA 1996 General Qu.14	
0.1	.	3	0.1						3	NR	27	SQA 1997 General Qu.4	
0.1	.	5	0.1					2	3	NR	31	SQA 1997 General Qu.13	
0.1	.	4	0.1					4		NR	34	SQA 1998 General Qu.3	
0.1	(a)	1	0.1			1				NR	42	SQA 1998	
	(b)	2	0.1			2				NR		General Qu.20	
0.1	.	2	0.1					2		R	48	SQA 1999 General Qu.16	
1.1	(a)	1	0.1			1				R	37	SQA 1998	
	(b)	2	1.1.6			2				R		General Qu.9	
	(c)	3	1.1.6	1.4.1		2	1			R			
	(d)	2	0.1				2			NR			
1.1	.	4	1.1.1			1	1			NR	17	SQA 1995	
				0.1		1	1					General Qu.17	

Main Unit & Outcome part	marks	Content Main	Reference : Other	marks distribution						R/NR	page no.	Source
				non calc		calc		calc neut				
				C	A/B	C	A/B	C	A/B			
1.1	3	1.1.1			2	1			R	18	SQA 1996 General Qu.1	
1.1	3	1.1.1	1.4.1		2				R	43	SQA 1999 General Qu.2	
1.1	3	1.1.2	0.1			2			NR	23	SQA 1996 General Qu.15	
1.1	2	1.1.4				2			R	41	SQA 1998 General Qu.18	
1.1	2	1.1.6			2				R	44	SQA 1999 General Qu.4	
1.2	(a) 1 (b) 1 (c) 3	0.1 2.4.1 1.2.2	0.1		1				NR NR NR	7	SQA 1994 General Qu.13	
1.2	(a) 1 (b) 3 (c) 2	0.1 1.2.3 1.2.1			1				R R R	16	SQA 1995 General Qu.15	
1.2	(a) 3 (b) 4	0.1 1.2.1				3			NR NR	48	SQA 1999 General Qu.17	
1.2	5	1.2.1			3	2			R	21	SQA 1996 General Qu.7	
1.2	4	1.2.1				4			NR	29	SQA 1997 General Qu.8	
1.2	(a) 2 (b) 3	1.2.2 1.2.2				2			NR NR	39	SQA 1998 General Qu.13	
1.2	(a) 3 (b) 3	1.2.3 0.1	0.1			2			R NR	8	SQA 1994 General Qu.16	
1.2	(a) 3 (b) 1	1.2.3 1.1.3	0.1		2				R NR	40	SQA 1998 General Qu.16	
1.2	(a) 4 (b) 2	1.2.3 2.2.4	1.1.4			3			R R	46	SQA 1999 General Qu.11	
1.3	3	1.3.2	0.1			2			NR	9	SQA 1994 General Qu.17	
1.4	(a) 1.4.1 (b) 2	0.1					1		R R	35	SQA 1998 General Qu.4	

Main Unit & Outcome	part	marks	Content Main	Reference : Other	marks distribution						R/NR	page no.	Source
					non calc		calc		calc neut				
					C	A/B	C	A/B	C	A/B			
1.4	.	3	1.4.1				3				R	1	SQA 1994 General Qu.1
1.4	.	5	1.4.1				1	4			NR	2	SQA 1994 General Qu.6
1.4	(a)	3	1.4.1				2	1			R	14	SQA 1995
	(b)	3	1.4.1				2	1			NR		General Qu.7
1.4	(a)	4	1.4.1				4				R	27	SQA 1997
	(b)	3	2.2.3				2				NR		General Qu.3
				1.4.1				1					
1.4	.	5	1.4.1				3				R	28	SQA 1997 General Qu.5
				1.1.1			2						
1.4	(a)	2	1.4.1				2				R	33	SQA 1998
	(b)	2	1.1.2					2			R		General Qu.2
1.4	(a)	2	1.4.1						2		R	40	SQA 1998
	(b)	3	0.1							3	NR		General Qu.14
1.4	.	5	1.4.1				4				R	45	SQA 1999 General Qu.7
1.4	.	2	1.4.2				2				R	11	SQA 1995 General Qu.1
1.4	.	5	1.4.2				2				NR	22	SQA 1996 General Qu.11
				1.4.3				3					
1.4	(a)	2	1.4.3					2			R	35	SQA 1998
	(b)	3	1.4.3					3			R		General Qu.5
2.1	(a)	2	2.1.1						2		R	5	SQA 1994
	(b)	1	0.1							1	R		General Qu.9
2.1	(a)	1	2.1.1		1						R	29	SQA 1997
	(b)	1	0.1			1					R		General Qu.7
2.1	(a)	2	2.1.2						2		R	11	SQA 1995
	(b)	1	2.1.2							1	R		General Qu.2
2.1	.	3	2.1.2				3				R	19	SQA 1996 General Qu.3
2.1	.	3	2.1.2						3		R	26	SQA 1997 General Qu.2
2.1	(a)	1	2.1.2						1		R	33	SQA 1998
	(b)	1	2.1.2						1		R		General Qu.1

Main Unit & Outcome	part	marks	Content Main	Reference : Other	marks distribution						R/NR	page no.	Source
					non calc		calc		calc neut				
					C	A/B	C	A/B	C	A/B			
2.1	(a)	2	2.1.2					2		R	44	SQA 1999	
	(b)	2	2.1.2					2		NR		General Qu.6	
2.2	(a)	1	2.2.2			1				R	21	SQA 1996	
	(b)	1	2.2.1			1				R		General Qu.8	
	(c)	3	2.2.4				3			R			
				2.2.1			1						
2.2	(a)	2	2.2.3					2		R	13	SQA 1995	
	(b)	1	0.1					1		NR		General Qu.5	
2.2	.	4	2.2.3					2	2	NR	19	SQA 1996	
												General Qu.6	
2.2	(a)	1	2.2.3			1				R	36	SQA 1998	
	(b)	4	2.2.3				3			NR		General Qu.7	
				0.1		1							
2.2	.	3	2.2.4				3			R	6	SQA 1994	
												General Qu.12	
2.3	.	3	2.3.1				2			R	4	SQA 1994	
				1.1.5			1					General Qu.7	
2.3	.	4	2.3.1				4			NR	16	SQA 1995	
												General Qu.14	
2.3	(a)	3	2.3.1				3			NR	25	SQA 1996	
	(b)	2	0.1				2			NR		General Qu.19	
2.3	.	4	2.3.1				3			NR	28	SQA 1997	
				0.1			1					General Qu.6	
2.3	(a)	4	2.3.1				4			NR	38	SQA 1998	
	(b)	2	1.2.1				2			R		General Qu.11	
2.3	.	4	2.3.1				3			R	45	SQA 1999	
				0.1			1					General Qu.8	
2.4	(a)	1	2.4.1				1			R	2	SQA 1994	
	(b)	3	2.4.1				2			R		General Qu.5	
				1.1.4			1						
2.4	.	3	2.4.1				2			R	30	SQA 1997	
				1.1.4			1					General Qu.11	
2.4	(a)	1	2.4.1					1		R	43	SQA 1999	
	(b)	2	2.4.1					2		R		General Qu.1	
	(c)	2	2.4.1					2		R			
2.4	(a)	1	2.4.1					1		R	49	SQA XXX	
	(b)	2	2.4.1					2		R		Qu.1	
	(c)	1	2.4.3					1		R			

Main Unit & Outcome	part	marks	Content Main	Reference : Other	marks distribution						R/NR	page no.	Source
					non calc		calc		calc neut				
					C	A/B	C	A/B	C	A/B			
2.4	(a)	1	2.4.1			1				R	50	SQA XXX	
	(b)	1	2.4.1			1				R		Qu.2	
	(c)	2	2.4.1				2			R			
2.4	(a)	1	2.4.1					1		R	51	SQA XXX	
	(b)	1	2.4.1					1		R		Qu.3	
	(c)	2	2.4.1					2		R			
	(d)	1	1.1.2						1	R			
2.4	(a)	1	2.4.1					1		R	52	SQA XXX	
	(b)	2	2.4.1					2		R		Qu.4	
	(c)	1	2.4.1						1	NR			
2.4	(a)	2	2.4.1			2				NR	57	SQA XXX	
	(b)	2	2.4.2			2				R		Qu.10	
	(c)	1	2.5.3					1		NR			
2.4	(a)	1	2.4.1			1				R	58	SQA XXX	
	(b)	1	2.5.1			1				R		Qu.11	
	(c)	2	2.4.1					2		NR			
2.4		2	2.4.1					2		R	60	SQA XXX	
												Qu.14	
2.4	(a)	2	2.4.1					2		NR	63	SQA XXX	
	(b)	2	2.4.1					2		NR		Qu.19	
2.4	(a)	3	2.4.2					3		R	54	SQA XXX	
	(b)	1	2.4.2					1		R		Qu.6	
2.4	(a)	2	2.4.2			2				R	56	SQA XXX	
	(b)	2	2.4.1					2		NR		Qu.9	
2.4	(a)	1	2.4.5					1		R	64	SQA XXX	
	(b)	1	2.4.6					1		R		Qu.20	
	(c)	2	2.4.6					2		R			
2.4	(a)	2	2.4.5					2		R	65	SQA XXX	
	(b)	1	2.4.5					1		R		Qu.21	
2.4	(a)	1	2.4.5					1		R	66	SQA XXX	
	(b)	2	2.4.6					1	1	R		Qu.22	
	(c)	2	2.4.6					2		R			
2.5	(a)	4	2.5.1					4		R	60	SQA XXX	
	(b)	4	2.5.1					4		R		Qu.15	
2.5	(a)	4	2.5.1					4		R	61	SQA XXX	
												Qu.17	
2.5	(a)	4	2.5.1					4		R	62	SQA XXX	
	(b)	4	2.5.1					4		R		Qu.18	

Main Unit & Outcome	part	marks	Content Main	Reference : Other	marks distribution						R/NR	page no.	Source
					non calc		calc		calc neut				
					C	A/B	C	A/B	C	A/B			
2.5	(a)	3	2.4.2					3		R	53	SQA XXX	
	(b)	3	2.5.1						3	R		Qu.5	
2.5	(a)	4	2.5.2			4				R	59	SQA XXX	
	(b)	3	2.5.2			3				R		Qu.12	
2.5	(a)	2	2.5.3						2	R	55	SQA XXX	
	(b)	2	2.5.3						2	NR		Qu.7	
2.5	.	2	2.5.4					2		R	55	SQA XXX Qu.8	
2.5	.	2	2.5.4						2	NR	59	SQA XXX Qu.13	
2.5	.	2	2.5.4						2	R	61	SQA XXX Qu.16	
3.1	(a)	2	0.1		2					NR	38	SQA 1998	
	(b)	2	3.1.5		2					R		General Qu.10	
3.1	.	3	3.1.1			3				R	4	SQA 1994 General Qu.8	
3.1	(a)	3	3.1.1			3				R	32	SQA 1997	
	(b)	4	0.1				4			NR		General Qu.16	
3.1	(a)	2	3.1.3		2					R	24	SQA 1996	
	(b)	3	3.1.5		3					R		General Qu.17	
3.1	(a)	2	3.1.3		2					R	47	SQA 1999	
	(b)	3	3.1.5		3					R		General Qu.14	
3.1	.	2	3.1.4		2					R	15	SQA 1995 General Qu.13	
3.1	.	2	3.1.4		2					R	39	SQA 1998 General Qu.13	
3.1	.	2	3.1.5		2					R	15	SQA 1995 General Qu.11	
3.1	.	3	3.1.6		2					R	9	SQA 1994 General Qu.14	
				1									
3.1	(a)	2	3.1.6		2					R	31	SQA 1997	
	(b)	2	3.1.4		2					R		General Qu.14	
3.1	.	2	3.1.6		2					R	36	SQA 1998 General Qu.6	
3.2	(a)	2	3.2.2		2					R	46	SQA 1999	
	(b)	2	3.2.2		2					R		General Qu.9	

Main Unit & Outcome	part	marks	Content Main	Reference : Other	marks distribution						R/NR	page no.	Source
					non calc		calc		calc neut				
					C	A/B	C	A/B	C	A/B			
3.3	.	4	3.3.1			4				R	6	SQA 1994 General Qu.11	
3.3	.	4	3.3.1			4				R	14	SQA 1995 General Qu.10	
3.3	.	4	3.3.1			4				R	23	SQA 1996 General Qu.16	
3.3	.	4	3.3.1			4				R	30	SQA 1997 General Qu.12	
3.3	.	4	3.3.1	0.1		3				NR	42	SQA 1998 General Qu.19	
3.3	.	4	3.3.1	1.1.5		3				R	47	SQA 1999 General Qu.12	
3.4	(a)	1	0.1		1					R	26	SQA 1997	
	(b)	1	3.4.2		1					R		General Qu.1	
3.4	.	2	3.4.1					2		R	18	SQA 1996 General Qu.2	

SECTION 4
QUESTIONS BANK

Iain has bought video equipment costing £1850 and wants to insure it.
 The insurance company charges £1.16 for every £100 of goods to be insured.
 What will it cost Iain to insure his video equipment?

(3)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR		Source 1994 General Qu. 1
			C	A/B	C	A/B	C	A/B			
.	3	1.4.1			3				R		

$\bullet^1 \frac{1850}{100} = 18.5$ $(\bullet^2) 18.5 \times £1.16$ $(\bullet^3) £21.46$	(\bullet^2) means the \bullet^2 is awarded for previous answer multiplied by £1.16
--	--

The graph shows some information about two boys, Alexander and Darren.

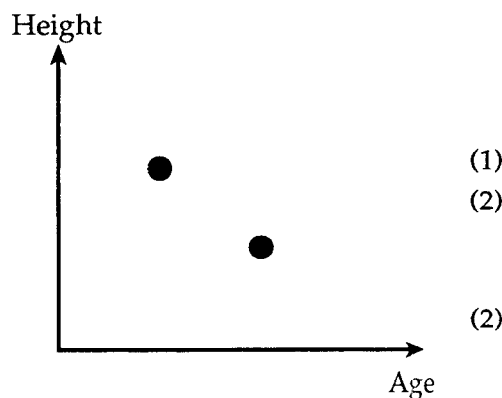
Alexander is older than Darren.

(a) Label the dots on the graph with the names of the two boys.

(b) What else does the graph tell you about the two boys?

(c) Claire is the same age as Darren and is taller than both boys.

Show this information by marking a dot on the graph.



part	marks	Content ref.	non-calc		calc		calc neut		R/NR		Source 1994 General Qu. 2
			C	A/B	C	A/B	C	A/B			
(a)	1	0.1					1		NR		
(b)	2	0.1					2		NR		
(c)	2	0.1					2		NR		

\bullet^1 left dot = Darren, other dot = Alex \bullet^2 comparison involving heights \bullet^3 correct comparison ("Darren is taller" earns \bullet^2 and \bullet^3)		\bullet^4 "Claire dot" same age as Darren \bullet^5 "Claire dot" taller than both boys	
--	--	---	--

Two estate agents charge different amounts for selling house.

TIMSON & CO
CHARGES:
1½% OF THE HOUSE VALUE

WILSON & LYLE
CHARGES:
2% of the house value up to £30 000
plus
1% of the house value above £30 000

Mr and Mrs Bernstein want to sell their house which has a value of £70 000.

Which estate agent should they use?

You must show all your working.

(5)

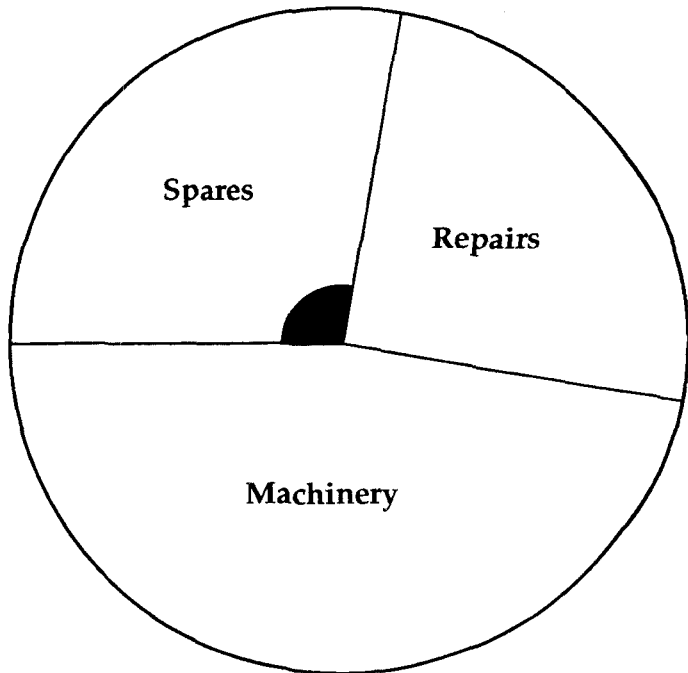
part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
	5	1.4.1			1	4			NR	1994 General Qu. 6

• ¹	1.5% of £70 000
• ²	working with £30 000 and £40 000
• ³	2% of £30 000 and 1% of £40 000
• ⁴	£1050 and £600 and £400
• ⁵	Wilson and Lyle

The pie chart shows how an agricultural company spent £86 000 000 in one year on machinery, spares and repairs.

(a) Measure the size of the shaded angle.

(b) Calculate the amount of money spent on spares, giving your answer to the nearest million pounds.



(1)

(3)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
(a)	1	2.4.1			1				R	1994 General Qu. 5
(b)	3	2.4.1, 1.1.4			2, 1				R	

• ¹	100° ± 2°	(• ²)	$\frac{100}{360} \times £86\,000\,000$	(• ³)	£23 888 888.89	(• ⁴)	£24 000 000
----------------	-----------	-------------------	--	-------------------	----------------	-------------------	-------------

Mr and Mrs Campbell's children have had their photographs taken at school. The photographs are available in the following packs.

Pack A costs £8.00
 Pack B costs £6.50
 Pack C costs £5.50

Mr and Mrs Campbell want to buy 3 packs of photographs but decide to spend not more than £20 in total.

One way they could do this is to buy 1 of pack B and 2 of pack C which would cost a total of £17.50. This is shown in the first row of the table below.

Number of Pack A	Number of Pack B	Number of pack C
	1	2

- (a) Fill in the rest of the table to show all the different ways Mr and Mrs Campbell could buy 3 packs of photographs of their children. (3)
- (b) They choose the way that gives them the largest number of photographs, but they still spend not more than £20.

Pack A contains 1 large, 2 medium and 4 small photographs
 Pack B contains 1 large, 2 medium
 Pack C contains 2 medium and 2 small photographs.

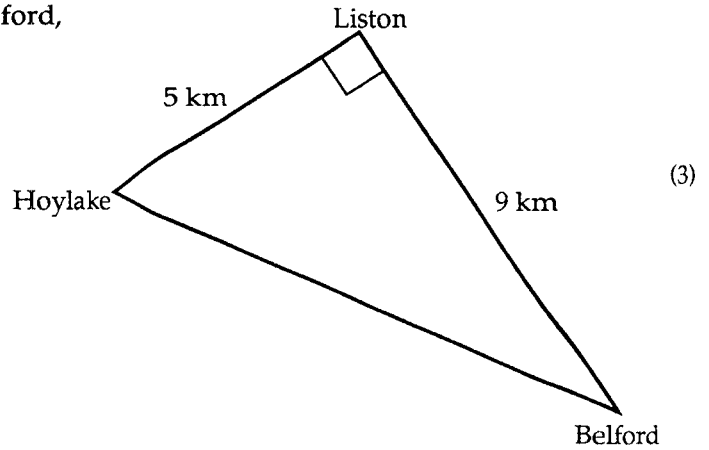
Which packs do they buy and how many photographs is this in total?
 You must show all your working. (3)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source 1994 General Qu. 4
			C	A/B	C	A/B	C	A/B		
(a)	3	0.1			2	1			NR	
(b)	3	0.1					3		NR	

• ¹	1 complete row	$\binom{4}{\bullet}$	any 1 total		A	B	C	Total
					0	1	2	11
• ²	any 3 complete rows	$\binom{5}{\bullet}$	any 4 totals		1	1	1	14
					1	0	2	15
• ³	all 5 complete rows	$\binom{6}{\bullet}$	answer where at least 2 totals compared		0	2	1	10
					0	3	0	9
					0	0	3	12

The diagram shows the position of three towns, Belford, Hoylake and Liston.

Calculate the distance from Hoylake to Belford.
Give your answer correct to 1 decimal place.



part	marks	Content ref.	non-calc		calc		calc neut		R/NR		Source 1994 General Qu. 7
			C	A/B	C	A/B	C	A/B			
.	3	2.3.1 1.1.5			2 1				R		

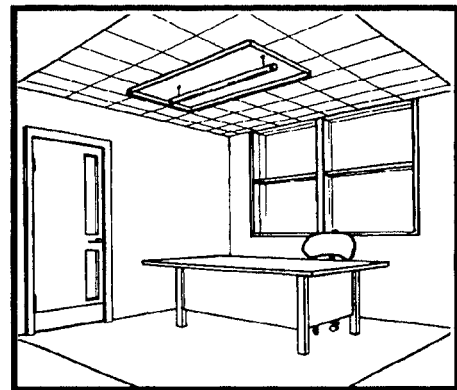
\bullet^1 $9^2 + 5^2 = \dots = 106$ (\bullet^2) $\sqrt{106} = 10.29$ (\bullet^3) 10.3

The amount of light needed in an office depends on its room index, R.

$$R = \frac{LW}{H(L+W)}$$

where L metres is the length of the office
W metres is the width of the office
H metres is the height of the light above the desk.

Calculate the room index for an office 5.5 metres long and 4.2 metres wide, with light 1.3 metres above the desk.

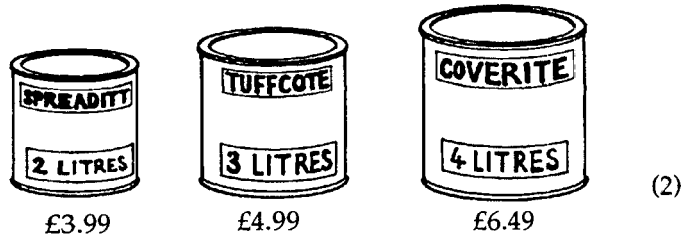


part	marks	Content ref.	non-calc		calc		calc neut		R/NR		Source 1994 General Qu. 8
			C	A/B	C	A/B	C	A/B			
.	3	3.1.1			3				R		

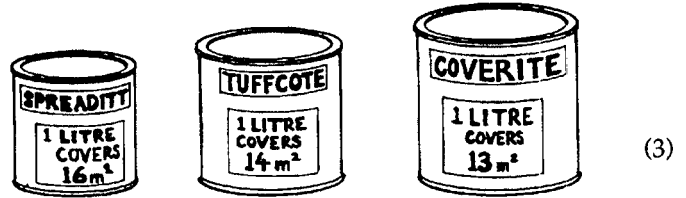
\bullet^1 $R = \frac{5.5 \times 4.2}{1.3(5.5 + 4.2)}$ (\bullet^2) $\frac{23.1}{12.61}$ (\bullet^3) 1.8
--

A superstore has three kinds of paint.

- (a) Using the information shown, explain why Coverite appears to give the best value for money.



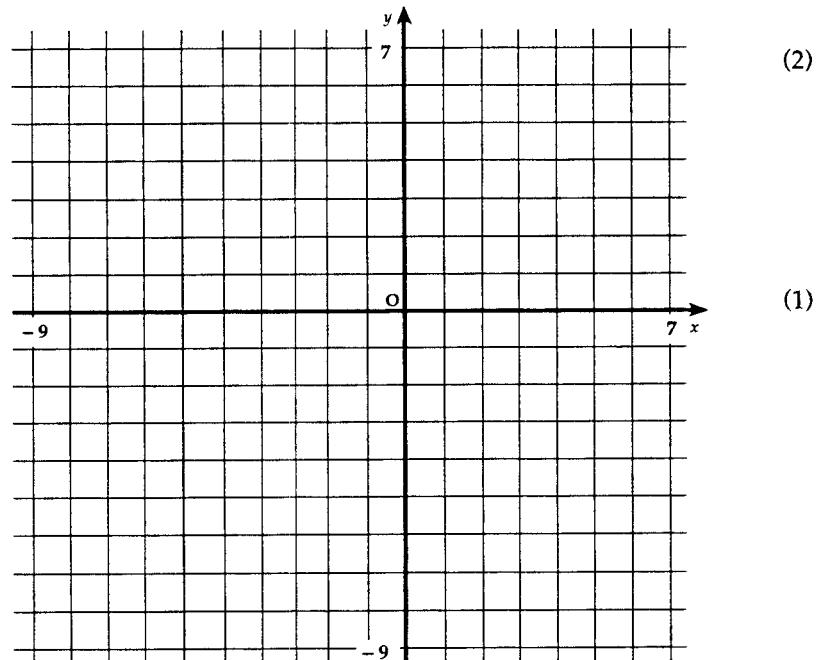
- (b) On the backs of the tins is more information. Using this additional information, decide which paint is the best value for money. You must show all your working.



part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
(a)	2	0.1			2				NR	1994 General Qu. 10
(b)	3	0.1				3			NR	

<ul style="list-style-type: none"> •¹ $\frac{£3.99}{2}$ and $\frac{£4.99}{3}$ and $\frac{£6.49}{4}$ •² $£1.99 / £2.00$ and $£1.66 / 7$ and $£1.62 / 3$ so Coverite the cheapest (apparently!) 	<ul style="list-style-type: none"> •³ $\frac{£1.99}{16}$ and $\frac{£1.66}{14}$ and $\frac{£1.62}{13}$ •⁴ 0.1247 and 0.1188 and 0.1248 •⁵ so Tuffcote best value
---	---

- (a) On the diagram plot the points $(-7, 0)$, $(-2, -8)$ and $(6, -3)$.

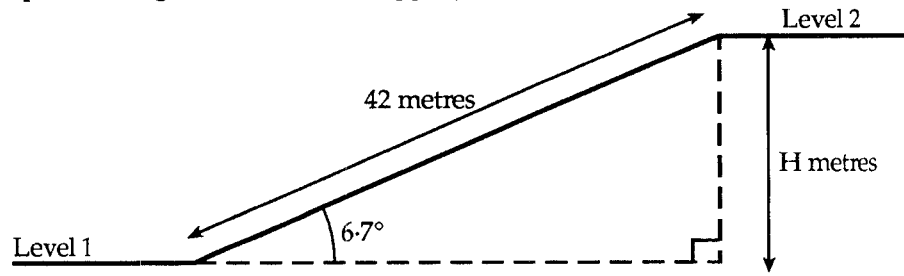


- (b) The three points above are corners of a square. On the same diagram, plot the point which is the fourth corner of the square.

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
(a)	2	2.1.1					2		R	1994 General Qu. 9
(b)	1	0.1						1	R	

<ul style="list-style-type: none"> •¹ plotting 2 points correctly •² plotting 3rd point correctly 	<ul style="list-style-type: none"> •³ plotting (or stating coordinates of) 4th point
---	--

The diagram shows a ramp connecting two levels in a shopping centre.



The ramp is 42 metres long, and slopes at an angle of 6.7° , as shown in the diagram.
Calculate the difference in height, H metres, between the two levels.

(4)

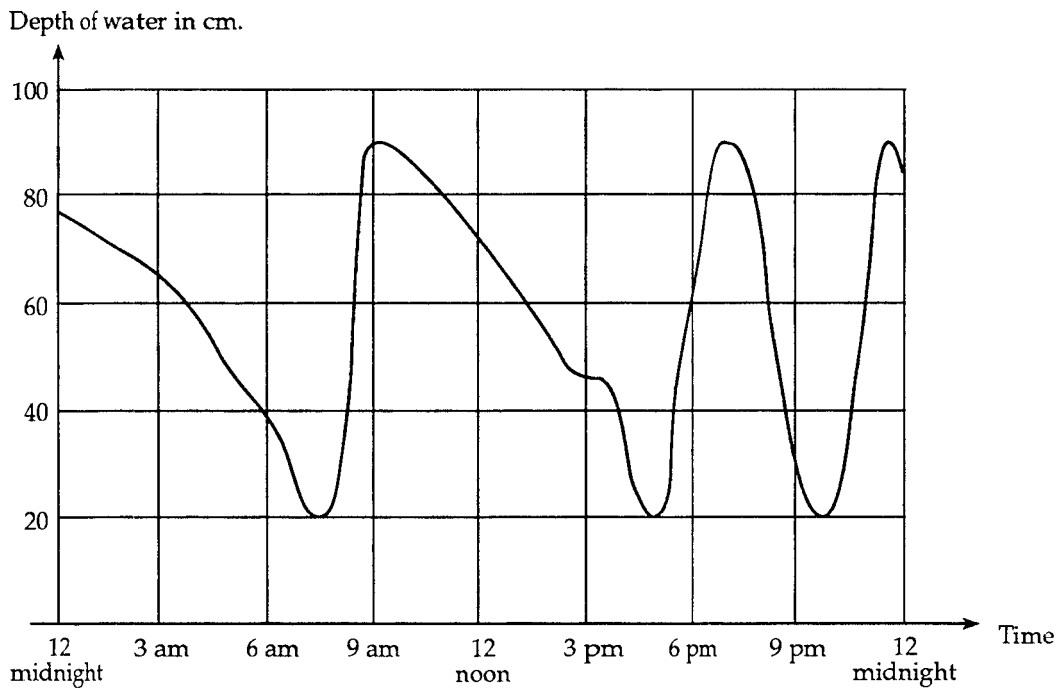
part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
.	4	3.3.1			4				R	1994 General Qu. 11
<ul style="list-style-type: none"> •¹] $\sin 6.7^\circ = \frac{H}{42}$ (or $\cos 83.3^\circ = \frac{H}{42}$) •²] •³ $H = 42 \sin 6.7^\circ$ •⁴ 4.9 										

Three friends set off on an 820 kilometre journey.
They travel at an average speed of 80 kilometres per hour.
How long will the journey take?
Give your answer in hours and minutes.

(3)

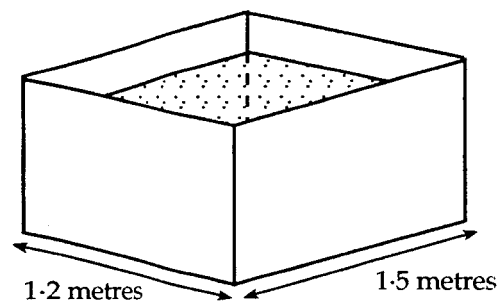
part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
.	3	2.2.4			3				R	1994 General Qu. 12
<ul style="list-style-type: none"> •¹ $T = \frac{820}{80}$ (stated or implied by •²) •² $T = 10.25$ •³ 10hours 15 minutes 										

Water is stored in a tank. When the water level falls to a certain depth, the tank is automatically refilled. The graph shows the depth of water in the tank during a period of 24 hours.



- (a) How many times was the tank refilled during the 24 hours? (1)
- (b) What is the depth of water when the tank has just been refilled? (1)
- (c) The water tank is in the shape of a cuboid of length 1.5 metres and breadth 1.2 metres.

How many litres of water are in the tank when it has just been refilled?

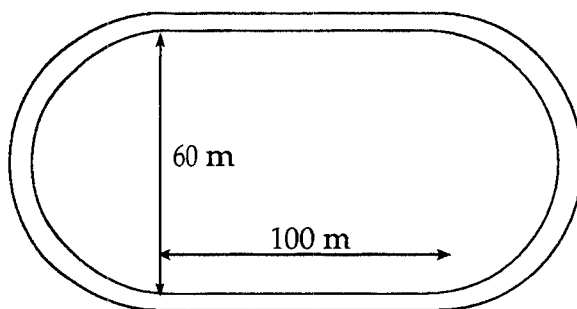


(3)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source 1994 General Qu. 13
			C	A/B	C	A/B	C	A/B		
(a)	1	0.1			1				NR	
(b)	1	2.4.1			1				NR	
(c)	3	1.2.2 0.1				2			NR	
						1				

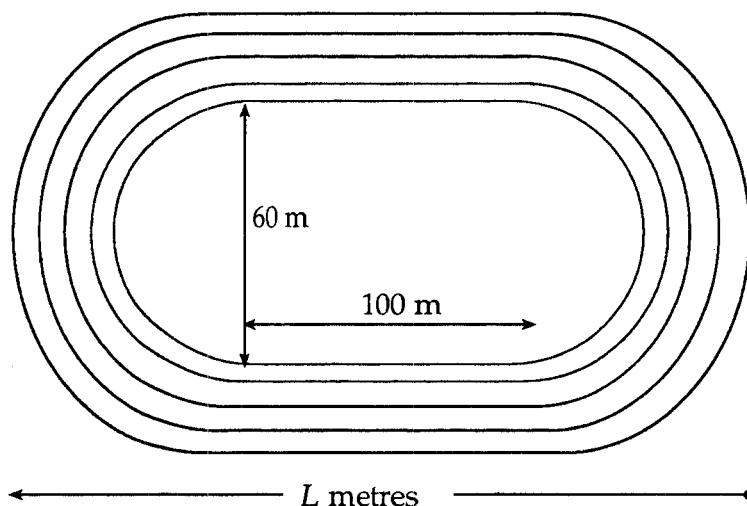
- ¹ 3
- ² 90cm (± 1)
- ³ height = 90cm
- ⁴ $V = 150 \times 120 \times 90$
- ⁵ $V = 1620000 \div 1000 = 1620$ litres

A running track is being marked out as shown.



The straight part of the track is 100m long and the width across the inside of the track is 60 metres. The ends of the track are semicircular.

- (a) Calculate the perimeter of the inside of the track. (3)
- (b) The completed track has four lanes as shown.



The lines marking the lanes are 1 metre apart. Calculate the overall length, L metres, of the track. (3)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
(a)	3	1.2.3				2			R	1994 General Qu. 16
		0.1				1				
(b)	3	0.1				3			NR	

•¹ use $C = \pi D$ **and not** doubling answer

•² $C = 188.4$

•³ 388.4

(200 + "calculation involving π ")

•⁴ $L = 100 + \dots$

•⁵ $L = 100 + 8 \dots$ **or** $L = 100 + 60 \dots$

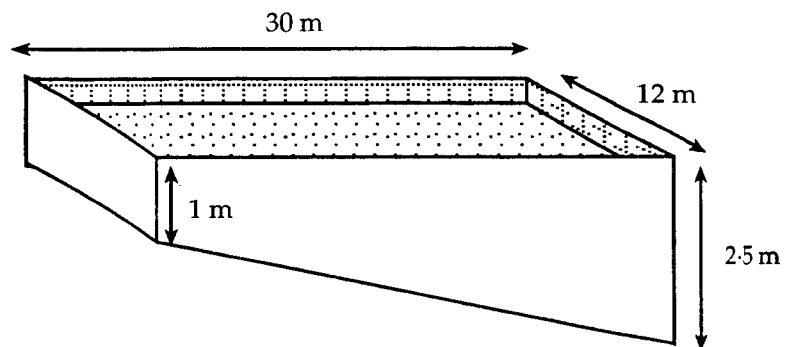
•⁶ $L = 100 + 60 + 8 = 168$

Solve the inequality $2(x + 3) < 18$.

(3)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
.	3	3.1.2 3.1.6	1 2						R	1994 General Qu. 14
<div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 30%;"> <ul style="list-style-type: none"> •¹ $2x + 6 < 18$ •² $2x < 12$ •³ $x < 6$ </div> <div style="width: 10%; text-align: center;">or</div> <div style="width: 30%; border: 1px solid black; padding: 5px;"> <ul style="list-style-type: none"> •¹ $x + 3 < 9$ •² $x < 6$ •³ $x < 6$ </div> </div>										

A new swimming pool is 30 metres long and 12 metres wide.
 The depth of the pool at the shallow end is to be 1 metre.
 It is proposed that the depth at the deep end is 2.5 metres.



Regulations state that the slope of the bottom of the pool must be less than 0.07.

The slope can be calculated using the rule $\text{slope} = \frac{\text{change in depth of pool, in metres}}{\text{length of pool, in metres}}$.

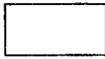
Will the new pool satisfy the regulations? You must give a reason for your answer.

(3)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
.	3	1.3.2 0.1				2 1			NR	1994 General Qu. 17
<ul style="list-style-type: none"> •¹ $2.5 - 1 = 1.5$ •² $\frac{1.5}{30} = 0.05$ •³ acceptable since $0.05 < 0.07$ 										

A company makes rectangular cards of different sizes. The cards are coded according to their size.

R1 is 1 cm by 2cm.



R2 is 2cm by 3cm



R3 is 3cm by 4cm



and so on.

(a) Write down the size of the next card, R4. (1)

(b) How many R4 pieces of card can be cut from an R10 piece of card?
You must explain your answer. (4)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR		Source 1994 General Qu. 19
			C	A/B	C	A/B	C	A/B			
(a)	1	0.1					1		NR		
(b)	4	0.1						4	NR		

<ul style="list-style-type: none"> •¹ 4cm by 5cm •² R10 is 10cm by 11cm •³ for a linear strategy •⁴ for 2 cards along length and 2 cards along breadth •⁵ 4 cards
--

Salvatore is going back to Italy to visit his parents.
He wants to exchange £160 into Lire.

Country	Rate per £
Austria	16.70 Schillings
France	8.15 Francs
Greece	365.00 Drachmas
Italy	2390.00 Lire
Spain	1296.58 Pesetas

How many Lire will he get?

(2)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR		Source 1995 General Qu. 1
			C	A/B	C	A/B	C	A/B			
.	2	1.4.2			2				R		
<ul style="list-style-type: none"> •¹ 2390.00×160 •² 382400 											

The table shows the average winter temperatures in four cities.

	London	New York	Rome	Moscow
Average winter temperature	3°C	-2°C	6°C	-8°C

(a) What is the difference between the average winter temperatures in London and Moscow?

(2)

(b) One winter's day, the temperature in New York was 7 degrees below average. What was the temperature that day?

(1)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR		Source 1995 General Qu. 2
			C	A/B	C	A/B	C	A/B			
(a)	2	2.1.2					2		R		
(b)	1	2.1.2						1	R		
<ul style="list-style-type: none"> •¹ $3 - (-8)$ •² 11 •³ $-2 - 7 = -9$ 											

The workers in a factory were voting on a proposed pay offer.

$\frac{5}{8}$ of the 368 workers voted to accept the offer.

How many workers was this?

(2)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR		Source 1995 General Qu. 3
			C	A/B	C	A/B	C	A/B			
.	2	0.1					2		R		

- ¹ know to divide by 8 and multiply by 5
- ² $\frac{1}{8} \times 368 \times 5 = 230$

Anne is trying to guess Martin's phone number. She knows it has four figures.

Martin tells Anne that the first three figures are all the same and that the sum of all four figures is 15.

(a) Write down all the possible four-figure numbers that fit the description of Martin's phone number.

(3)

(b) Martin now tells Anne that the last figure is a prime number.

Write down Martin's phone number.

(1)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR		Source 1995 General Qu. 4
			C	A/B	C	A/B	C	A/B			
(a)	3	0.1					2	1	NR		
(b)	1	0.1						1	NR		

- ¹ any one phone number
- ² any 2nd phone number
- ³ all 4 phone numbers
- ⁴ phone number from (a) ending in a prime

2229
3336
4443
5550
4443

The table below appeared in a newspaper and shows when street lights should come on and go off.

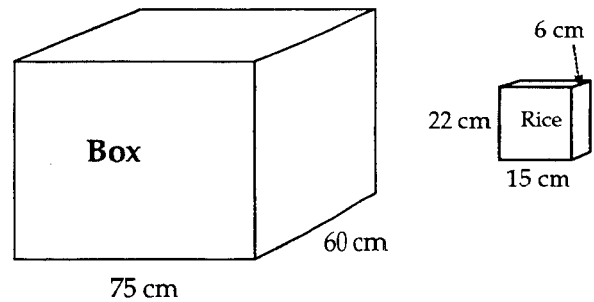
Lighting-up Times	
London	4.43 pm to 7.44 am
Bristol	4.52 pm to 7.53 am
Birmingham	4.46 pm to 7.54 am
Manchester	4.43 pm to 8.00 am
Newcastle	4.35 pm to 8.03 am
Glasgow	4.41 pm to 8.17 am
Belfast	4.54 pm to 8.18 am

- (a) How long, in hours and minutes, were the street lights on in Glasgow? (2)
- (b) Was the time of year summer or winter? You must give a reason for your answer. (2)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
(a)	2	2.2.3					2		R	1995 General Qu. 5
(b)	2	0.1					1		NR	

<ul style="list-style-type: none"> •¹ 4.41pm and 8.17am (•²) 15hr 36min (a correct time difference over midnight) •³ winter (with a reason) •⁴ reason: e.g. lights came on early 	(• ²) means that • ² can awarded for any correct time difference over midnight
--	---

A large box is filled with packets of rice. Each packet measures 15 centimetres by 6 centimetres by 22 centimetres and the packets are stacked upright in the box.



- (a) How many packets fit exactly into the base of the box? (2)
- (b) When full, the box contains 150 packets. What is the height of the box? (3)
- (c) How many boxes could be stacked on top of each other in a space which is 5 metres high? Show all your working. (3)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
(a)	2	0.1			2				R	1995 General Qu. 6
(b)	3	0.1				3			NR	
(c)	3	0.1				3			NR	

<ul style="list-style-type: none"> •¹ 5 packets fit lengthways, 10 fit breadthways •² total no of packets = $5 \times 10 = 50$ 	<ul style="list-style-type: none"> •³ no of packets in height = $\frac{150}{(\text{answer to (a)})}$ •⁴ $\times 22$ (•⁵) 66
---	---

This advertisement appeared in a newspaper.

A school telephoned for details of the special prices for the mid-week show.

Tickets for seats in the back stalls were bought for 20 pupils and 2 teachers.

The tickets cost a total of £60.

Strathclyde Theatre		
	Adult	Child
Balcony	£12	£8
Front Stalls	£10	£6
Back Stalls	£8	£5

*Phone for details of
Special Prices for Mid-week Show*

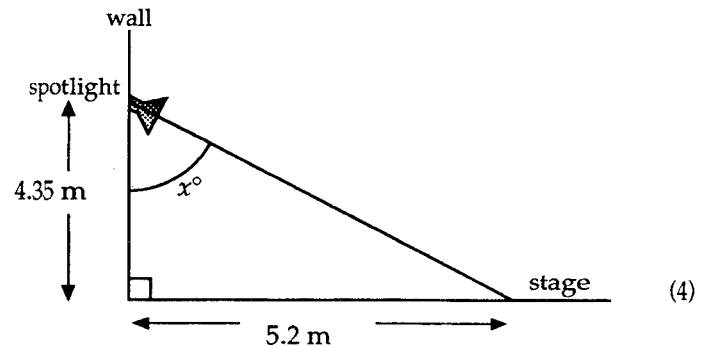
- (a) How much did the school save? (3)
- (b) The teachers paid £5 each for their tickets.
How much did each pupil's ticket cost? (3)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
(a)	3	1.4.1			2	1			R	1995 General Qu. 7
(b)	3	1.4.1			2	1		NR		

• ¹	$20 \times 5 + 2 \times 8$	• ⁴	10
• ²	£116	(• ⁵)	$60 - 10 = 50$
(• ³)	£56	(• ⁶)	$50 \div 20 = £2.50$

In a school hall, the stage is lit by a spotlight fixed to a wall.

The spotlight is 4.35 metres up the wall and is set to shine on a spot on the stage 5.2 metres away from the wall, as shown in the diagram.



- Calculate the size of the angle marked x° .
Do not use a scale drawing. (4)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
.	4	3.3.1			4				R	1995 General Qu. 10

• ¹	$\tan x^\circ = \frac{5.2}{4.35}$
• ²]
• ³	$\tan x^\circ = 1.195$
(• ⁴)	$x = 50$

Solve the equation

$$9 + 5x = 17.$$

(2)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR		Source 1995 General Qu. 11
			C	A/B	C	A/B	C	A/B			
.	2	3.1.5	2						R		

<p>•¹ $5x = 8$ (•²) $x = \frac{8}{5}$ (i.e. for division by 5)</p>

Factorise

$$15 - 10x.$$

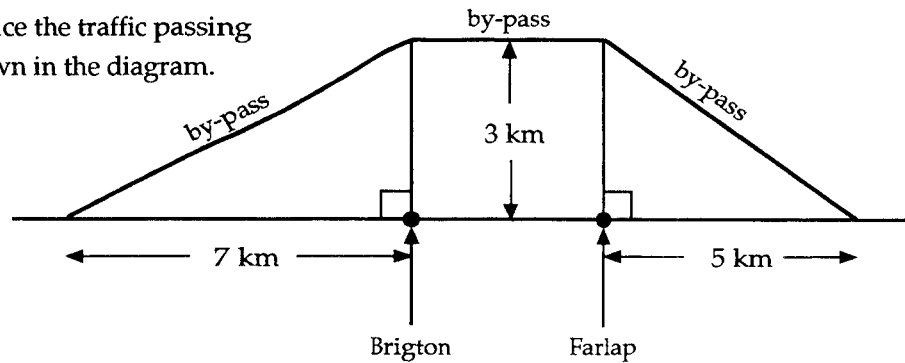
(2)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR		Source 1995 General Qu. 13
			C	A/B	C	A/B	C	A/B			
.	2	3.1.4	2						R		

<p>•¹ $5x \dots$ •² $\dots \times (3 - 2x)$</p>
--

Brigton and Farlap are two small towns 6 kilometres apart.

A by-pass is being built to reduce the traffic passing through the two towns, as shown in the diagram.



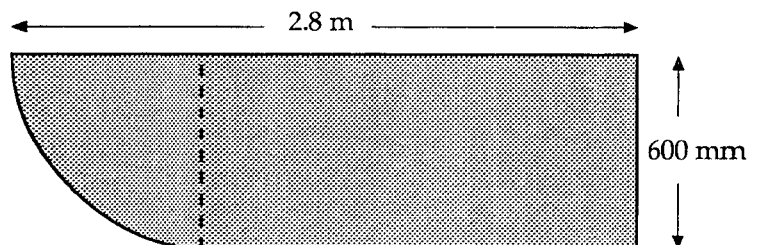
Calculate the total length of the by-pass.

(4)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR		Source 1995 General Qu. 14
			C	A/B	C	A/B	C	A/B			
.	4	2.3.1			4				NR		
<ul style="list-style-type: none"> •¹ strategy: know to use Pythagoras •² strategy: bypass 1 + bypass 2 + 6 •³ $x^2 = 7^2 + 3^2 \dots\dots x = 7.6$ or $y^2 = 3^2 + 5^2 \dots\dots y = 5.8$ •⁴ total = 19.4 											

A kitchen worktop is in the shape of a rectangle with a quarter-circle at one end.

The width of the worktop is 600 millimetres and the overall length is 2.8 metres, as shown in the diagram.



- (a) What is the width of the worktop in metres? (1)
- (b) Calculate the area of the quarter-circle in square metres. (3)
- (c) Calculate the area of the whole worktop in square metres. (2)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR		Source 1995 General Qu. 15
			C	A/B	C	A/B	C	A/B			
(a)	1	0.1			1				R		
(b)	3	1.2.3			3				R		
(c)	2	1.2.1			1	1			R		
<ul style="list-style-type: none"> •¹ 0.6 $(\bullet^2) 3.14 \times (0.6)^2$ $(\bullet^5) (2.8 - 0.6) \times 0.6 = 1.32$ $(\bullet^3) 1.13$ $(\bullet^6) 1.32 + 0.28 = 1.60$ $(\bullet^4) 1.13 \div 4 = 0.28$ 											

A new cinema with 760 seats has just opened.

During the first week, the cinema was open 7 days and ran 3 showings per day.

A total of 11530 tickets was sold.

The cinema manager has been set a target of selling at least 70% of the tickets for the first week.

Did the manager meet the target?

You must explain your answer.

(4)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
.	4	1.1.1 0.1			1	1			NR	1995 General Qu. 17
					1	1				

- ¹ total seats = $760 \times 3 \times 7$
- ² 70% of total seats
- ³ 11172
- (•⁴) met target since $11530 > 11172$

Alison has invested £16 000 in a bank account which pays 6.5% interest per annum.
 She invests the money for 3 months.
 Calculate the interest she receives on her money.

(3)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR		Source 1996 General Qu. 1
			C	A/B	C	A/B	C	A/B			
.	3	1.1.1			2	1			R		

\bullet^1 6.5% of £16 000 = £1040
 \bullet^2 $\frac{3}{12}$
 (\bullet^3) $\frac{3}{12}$ of 1040 = £260 (\bullet^3) means award \bullet^3 for finding $\frac{3}{12}$ of answer for (\bullet^2) i.e interest.

The average mass of a grain of pollen is 2.3×10^{-5} grams.
 Write this number out in full.

(2)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR		Source 1996 General Qu. 2
			C	A/B	C	A/B	C	A/B			
.	2	3.4.1					2		R		

\bullet^1 | 0.0000023 | means award both \bullet^1 and \bullet^2 for correct answer
 \bullet^2 | | i.e. 2 or 0.

The depth of a submarine was noted every three hours.

<i>Time</i>	Noon	3pm	6pm	9pm	Midnight
<i>Depth (m)</i>	-60	-17	-28	0	-23

Copy and complete the table below to show the change in depth of the submarine.

<i>Time interval</i>	<i>Change in depth</i>
Noon to 3pm	up 43 metres
3pm to 6pm	
6pm to 9pm	
9pm to midnight	

(3)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
.	3	2.1.2			3				R	1996 General Qu. 3

- ¹ **down** 11m (accept -11m)
- ² **up** 28m (accept +28m)
- ³ **down** 23m (accept -23m)

Shareen works flexitime in an office. This means that she can choose her starting and finishing times each day. One week she plans to leave work early on Friday so she works the following hours on Monday to Thursday.

<i>Day of the week</i>	<i>Start time</i>	<i>Finish time</i>	<i>Time taken for lunch</i>
Monday	9.00 am	5.30 pm	45 minutes
Tuesday	9.00 am	5.30 pm	45 minutes
Wednesday	9.00 am	5.30 pm	45 minutes
Thursday	9.00 am	5.30 pm	45 minutes

Note: Lunchtimes are not counted as part of working hours.

On Friday she starts work at 9.00 am and does not take a lunch break.

If Shareen wants to work exactly 35 hours this week, when should she leave work on Friday?

(4)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
.	4	2.2.3					2	2	NR	1996 General Qu. 6

- ¹ $4 \times 7\text{hr } 45\text{m}$
- ² $35 - (\text{answer to } \bullet^1)$
- ³ $9\text{am} + (\text{answer to } \bullet^2)$
- ⁴ 31hr, 4hr, 1pm

A college course is made up of 8 units of work. Students are graded A, B, C or D on each unit.

Each grade is worth a number of points as shown in the table below.

Grade A : 3 points	Grade B : 2 points	Grade C : 1 point	Grade D : 0 points
--------------------	--------------------	-------------------	--------------------

In order to pass the course, students need to

- (i) complete all 8 units **AND** (ii) score a total of 21 points or more.

One way is shown in below.

No. of As	No. of Bs	No. of Cs	No. of Ds	No. of points
7	0	0	1	21

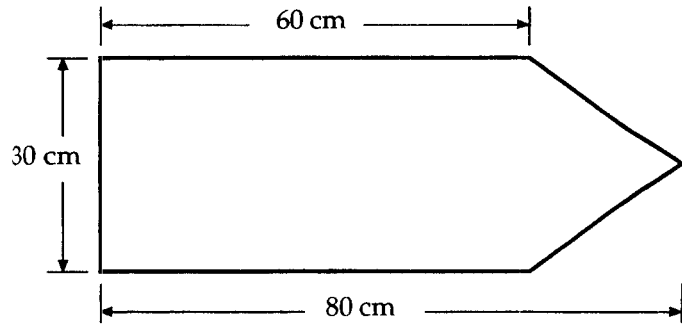
Complete the table (printed below) to show all the different ways of passing the course.

(4)

No. of As	No. of Bs	No. of Cs	No. of Ds	No. of points
7	0	0	1	21

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
.	4	0.1					4		NR	1996 General
										Qu. 5
• ¹		any two correct lines					8	0	0	24
• ²		another one correct line					7	1	0	23
• ³		another two correct lines					7	0	1	22
• ⁴		all six correct lines					6	2	0	22
							6	1	1	21
							5	3	0	21

The diagram below shows the shape of a traffic sign.
It consists of a rectangle and a triangle.



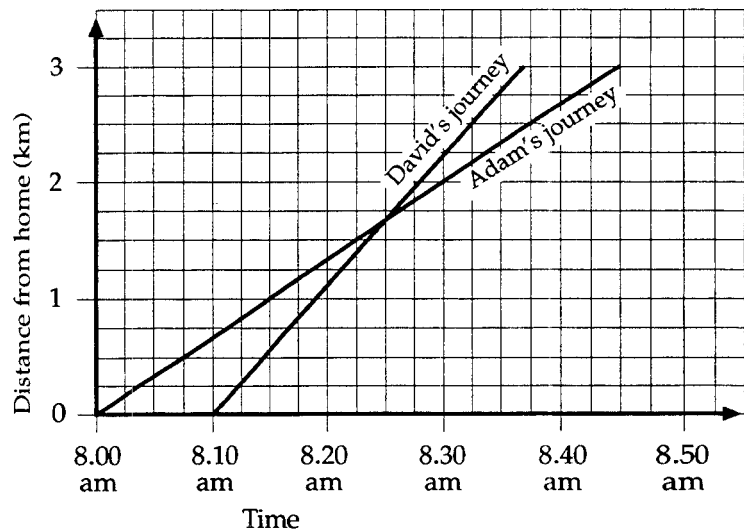
Calculate the area of the shape.

(5)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
.	5	1.2.1			3	2			R	1996 General Qu. 7
<p>•¹ Rect: $60 \times 30 = 1800$ (•⁴) $1800 + 300 = 2100$ •² height = 20 •⁵ sq cm (•³) $\frac{1}{2} \times 30 \times 20 = 300$</p>										

Alan and David are brothers.
Their journeys from home to school are shown on the graph.

- At what time do the brothers meet on their way to school?
- How far is the school from their home?
- Calculate Alan's average speed for the journey.
Give your answer in kilometres per hour.



(1)
(1)
(4)

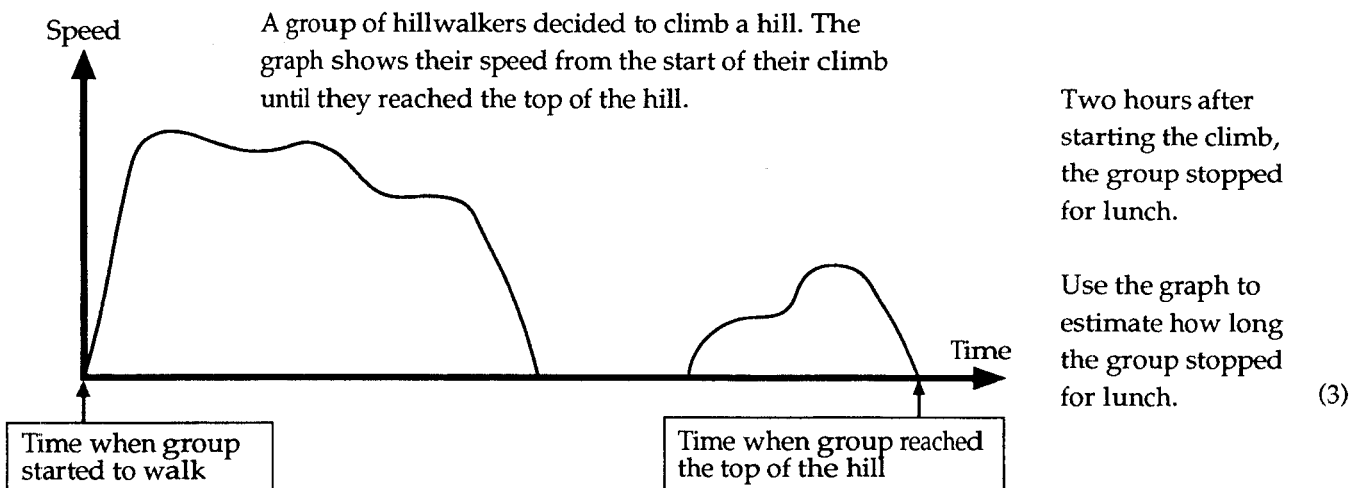
part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
(a)	1	2.2.2			1				R	1996 General Qu. 8
(b)	1	2.2.1			1				R	
(c)	4	2.2.1 2.2.4			1	3			R	
<p>•¹ 8.25 (am) •³ 45 min (•⁵) $\frac{3}{\frac{3}{4}}$ i.e. $\frac{\text{answer } \bullet^2}{\text{answer } \bullet^4}$ •² 3 (km) •⁴ $\frac{3}{4}$ hr (0.75) (•⁶) 4 (km/hr)</p>										

Sunni visited France last year for seven days.
 Before going on holiday she changed her £150 into French francs.
 The rate of exchange was 8.5 francs to the £.
 On holiday she spent 100 francs each day.
 When she returned home she changed the remaining francs back into pounds.
 The rate of exchange was 9.2 francs to the £.
 She was charged £4 for changing the francs back into pounds.
 How much did Sunni receive?

(5)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR		Source
			C	A/B	C	A/B	C	A/B			
.	5	1.42 1.43			2	3			NR		1996 General Qu. 11

• ¹ £150 = 150 × 8.5 = ...	(• ⁴) £62.50 - £4 = ...
(• ²) money left = 1275 - 7 × 100 = ...	• ⁵ all calcs correct (at least three)
(• ³) 575 F = £ $\frac{575}{9.2}$ = ...	1275 F, 575 F, £62.50, £58.50



(3)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR		Source
			C	A/B	C	A/B	C	A/B			
.	3	0.1						3	NR		1996 General Qu. 14

• ¹ 6 cm ↔ 2 hr
• ² 2 cm ↔ $\frac{1}{3}$ × 2 hr
• ³ 40 min

The percentage of softening agents in any fabric conditioner must be between 15% and 30% for it to be effective.

A 640 ml sample of Ocean, a new fabric conditioner, was found to contain 128 ml of softening agents.

Is Ocean an effective fabric conditioner?

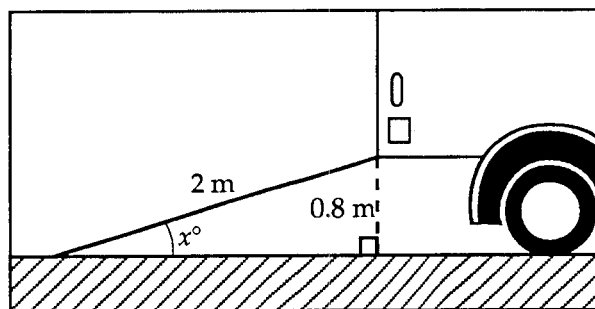
Give a reason for your answer.

(3)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
.	3	1.1.2 0.1				2 1			NR	1996 General Qu. 15

- ¹ $\frac{128}{640} \times 100\%$
- ² 20%
- (•³) effective since $15\% < 20\% < 30\%$

The sketch below shows a ramp at the back of a removal van.



The ramp is 2 metres long and is fixed to the van 0.8 metres above the ground.

Calculate the size of the angle marked x° .

(4)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
.	4	3.3.1			4				R	1996 General Qu. 16

- ¹] $\sin x^\circ = \frac{0.8}{2}$
- ²]
- ³ $\sin x^\circ = 0.4$
- (•⁴) $x = 23.6$

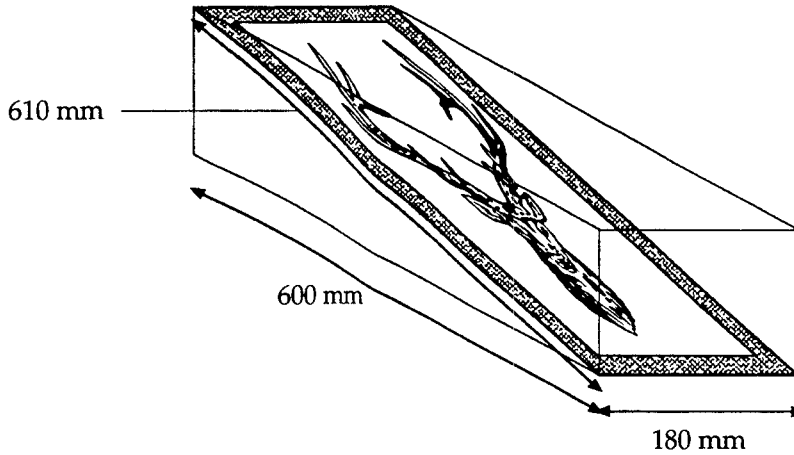
(a) Multiply out the brackets and simplify $5(3x + 2y) - 4x$. (2)

(b) Solve algebraically $7x + 3 = 2x + 15$. (3)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR		Source 1996 General Qu. 17
			C	A/B	C	A/B	C	A/B			
(a)	2	3.13	2						R		
(b)	3	3.15	3						R		

$\bullet^1 \quad 15x + 10y - 4x$ $\left(\bullet^2\right) \quad 11x + 10y$	$\bullet^3 \quad 5x = \dots$ $\bullet^4 \quad \dots = 12$ $\left(\bullet^5\right) \quad x = \frac{12}{5}$
--	---

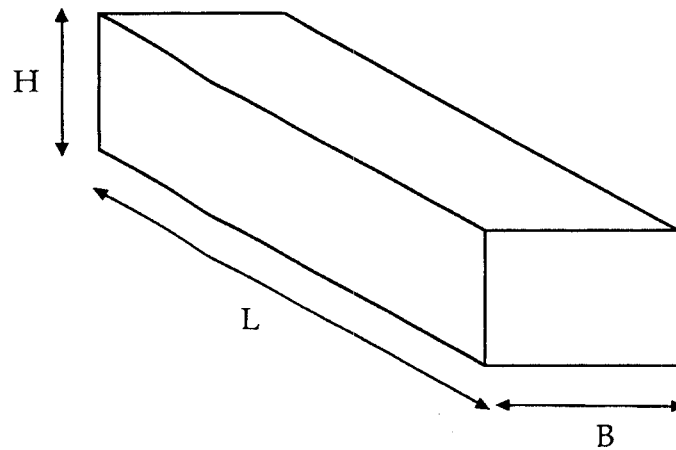
- (a) A rectangular picture measuring 610 millimetres by 180 millimetres is placed diagonally in a cuboid shaped box as shown in the first diagram



The box has length 600 millimetres and breadth 180 millimetres.
Calculate the height of the box.

(3)

- (b) An international parcel delivery service accepts cuboid shaped parcels as shown in Diagram 2 provided $L + B + H$ does not exceed 900 millimetres.



Will the box in part (a) be accepted by the parcel delivery service?
You must explain your answer.

(2)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR		Source 1996 General Qu. 19
			C	A/B	C	A/B	C	A/B			
(a)	3	2.3.1				3			NR		
(b)	2	0.1				2			NR		

•¹ know to use Pythagoras

•² **only** using 610 and 600

•³ $h = \sqrt{610^2 - 600^2} = 110$ (mm)

(•⁴) $L + B + H = 890$

(•⁵) yes since $890 < 900$

The brightest star in the sky has a diameter of 2.33 million kilometres.

(a) Write 2.33 million in figures. (1)

(b) Write 2.33 million in scientific notation. (1)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR		Source 1997 General Qu. 1
			C	A/B	C	A/B	C	A/B			
(a)	1	0.1	1						R		
(b)	1	3.4.2	1						R		

<p>•¹ 2 330 000 (•²) 2.33×10^6</p>	<p>(•²) means •² is awarded for writing whatever answer is obtained at •¹ in sc. notation</p>
---	--

During one week in winter, the midday temperatures in Oban were as shown.

Sunday	-1°C
Monday	-2°C
Tuesday	-3°C
Wednesday	4°C
Thursday	3°C
Friday	0°C
Saturday	6°C

Calculate the average of these temperatures. (3)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR		Source 1997 General Qu. 2
			C	A/B	C	A/B	C	A/B			
.	3	2.1.2					3		R		

<p>•¹ know $av = (\text{sum of temperatures}) \div 7$ •² $sum = 7^\circ$ (•³) $av = 7^\circ \div 7 = 1^\circ$</p>

Adam works in a factory.

He works a basic week of 39 hours; he is paid £4.80 per hour; all overtime is paid at time and a half.

- (a) One week Adam works 46 hours.
Calculate his gross pay. (4)

- (b) Adam should start work at 8 am.
Part of Adam's time card for one week is shown.
Each day his time card is checked.
He loses a quarter of an hour's basic pay for every 15 minutes, or part of 15 minutes, that he arrives late.
How much money does Adam lose for being late this week?

ADAM ROSS		START
MONDAY		0810
TUESDAY		0755
WED'DAY		0807
THURSDAY		0746
FRIDAY		0805

(3)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
(a)	4	1.4.1			4				R	1997 General Qu. 3
(b)	3	2.2.3			2				NR	
		1.4.1				1				

• ² basic pay = $39 \times £4.80 = £187.20$	(• ³) overtime = $7 \times 1\frac{1}{2} \times £4.80 = £50.40$	• ⁵ late 3 times
• ² overtime hours = 7	(• ⁴) Gross pay = £237.60	(• ⁶) $\frac{3}{4}$
		(• ⁷) $\frac{3}{4} \times £4.80 = £3.60$

Heather has a security lock for her mountain bicycle. The lock has a three-digit code.

Each digit can be 1, 2, 3, 4 or 5.

For example the code on this lock is 212.



On Heather's lock

- the first digit is a prime number greater than 3
- the sum of the three digits is greater than 12.

Write down all the possible codes for Heather's lock. (3)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
	3	0.1						3	NR	1997 General Qu. 4

• ¹ all combinations shown start with a 5
• ² any 4 correct combinations
• ³ a further 2 combinations (and none starting with a 5)

A mobile phone company lists its charges as follows:

Phone Rental £12.75 per month
 Peak rate calls 42p per minute
 Off-peak calls 18p per minute
 + VAT at 17.5%

Copy and complete this phone bill:	Rental for 1 month	£12.75	
	296 minutes at peak rate	£	
	183 minutes at off-peak rate	£	
	VAT at 17.5%	£	
	Total	_____	(5)

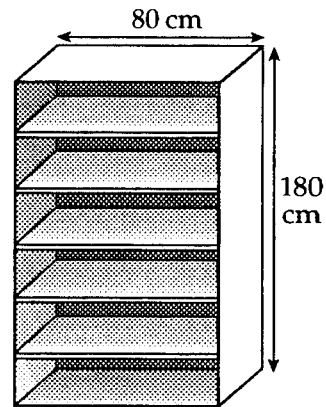
part	marks	Content ref.	non-calc		calc		calc neut		R/NR		Source 1997 General Qu. 5
			C	A/B	C	A/B	C	A/B			
.	5	1.4.1 1.1.1			3				R		
<ul style="list-style-type: none"> •¹ $296 \times 42p = £124.32$ •² $183 \times 18p = £32.94$ •³ VAT = 17.5% of £170.01 •⁴ VAT = £29.75 •⁵ Total = £199.76 											

Anwar is making a bookcase.

The back of the bookcase is rectangular in shape and measures 180 centimetres by 80 centimetres.

To make the bookcase stronger, Anwar is going to attach a metal strip along one of the diagonals at the back. He has a metal strip that is 2 metres long.

Is the strip long enough to fit along the diagonal?
 Give a reason for your answer.



(4)

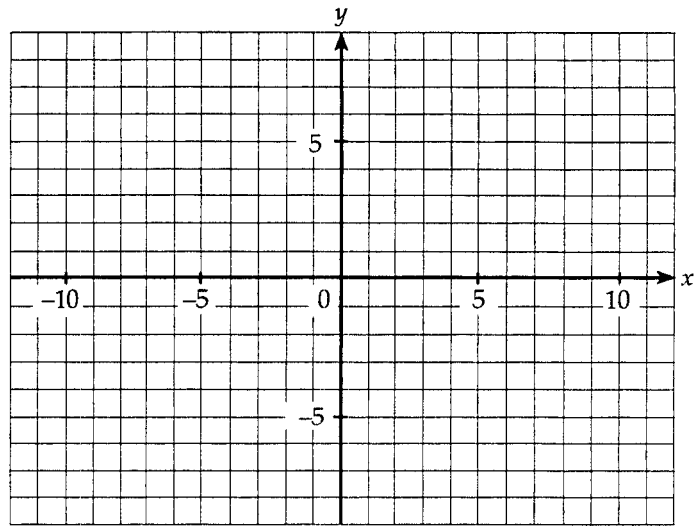
part	marks	Content ref.	non-calc		calc		calc neut		R/NR		Source 1997 General Qu. 6
			C	A/B	C	A/B	C	A/B			
.	4	2.3.1 0.1			3				NR		
<ul style="list-style-type: none"> •¹ strategy: using Pythagoras •² $d^2 = 180^2 + 80^2$ •³ $d = \sqrt{38800} = 196.98$ •⁴ yes, since $200 > 196.78$ 											

(a) On the grid plot the points
A(1,6), B(4,-2) and C(1,-4).

(1)

(b) Plot the point D so that ABCD
forms a kite.

(1)



part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
(a)	1	2.1.1	1						R	1997 General Qu. 7
(b)	1	0.1		1					R	

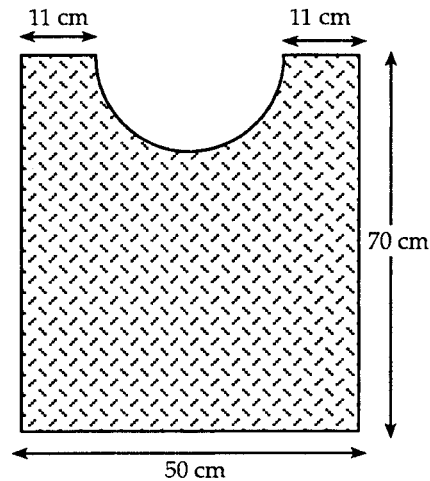
- ¹ all 3 points correct
- ² D plotted at (-2,-2)

larger grid available on page 32

A bathroom mat is shown.

The shape is a rectangle with a semi-circle cut out.

Calculate the area of the mat.



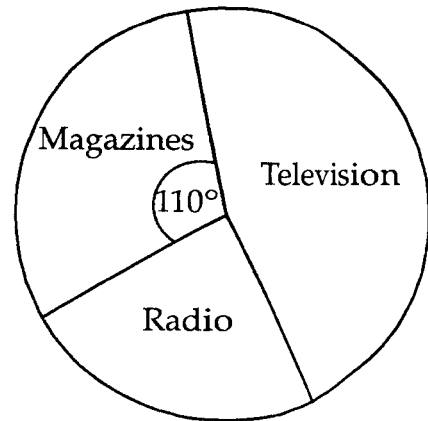
(4)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
.	4	1.2.1				4			NR	1997 General Qu. 8

- ¹ $R = 14$
- (•²) $\frac{1}{2} \times 3.14 \times 14^2$
- (•³) $(70 \times 50) - \frac{1}{2} \times 3.14 \times 14^2$
- (•⁴) 3192 cm^2

Last year a record company advertised in magazines, on radio and on television.

The total spent on advertising was £34 000 000.



Use the pie chart to calculate the amount of money spent on advertising in magazines.

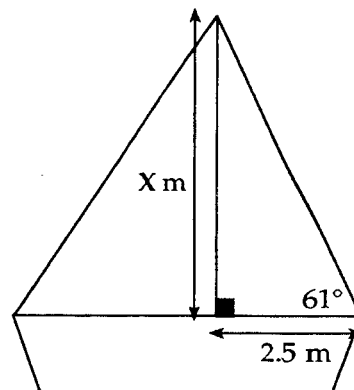
Round your answer to the nearest million pounds.

(3)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR		Source 1997 General Qu. 11
			C	A/B	C	A/B	C	A/B			
.	3	2.4.1 1.1.4			2 1				R		

- ¹ $\frac{110}{360}$
- ² $\frac{110}{360} \times 34\ 000\ 000 = \pounds 10\ 388\ 889$
- ³ $\pounds 10\ 000\ 000$

The diagram shows a yacht with a mast of height X metres.



Calculate the height of the yacht's mast.

Do not use a scale drawing.

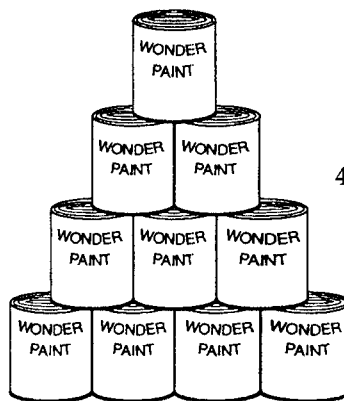
(4)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR		Source 1997 General Qu. 12
			C	A/B	C	A/B	C	A/B			
.	4	3.3.1			4				R		

- ¹ $\tan 61^\circ = \frac{x}{2.5}$
- ² \mid
- ³ $x = 2.5 \times 1.804$
- (•⁴) 4.51 metres

Sophia owns a paint shop.
She displays tins of paint as shown.

Each tin is 15 centimetres high.
Sophia wants the display to be 1.05 metres high.
How many tins of paint will she need?



This display has
4 rows and 10 tins

(5)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
.	5	0.1					2	3	NR	1997 General Qu. 13

• ¹	No of rows = $1.05m \div 15cm$
• ²	7
• ³	1 strategy:
• ⁴	1
• ⁵	7 rows need 28 tins

Row	1	2	3	4	5
Tins	1	3	6	10	15

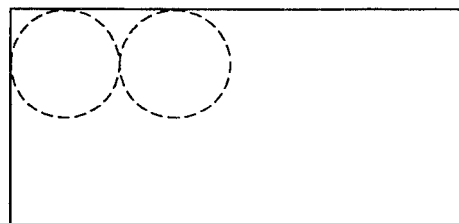
(a) Solve algebraically $6x - 2 \geq 17$. (2)

(b) Factorise fully $12ab - 8c$. (2)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
(a)	2	3.1.6	2						R	1997 General Qu. 14
(b)	2	3.1.4	2						R	

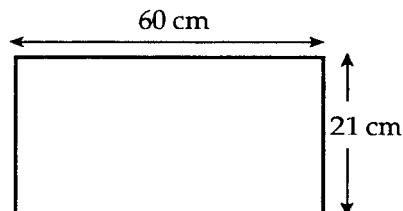
• ¹	$6x \geq 19$
(• ²)	$x \geq \frac{19}{6}$
• ³	$4 \times \dots$
• ⁴	$\dots \times (3ab - 2c)$

Circular plates are cut from a rectangular sheet of metal.
The area, A , of each plate is 340cm^2 .



- (a) Use the formula $r = \sqrt{\frac{A}{\pi}}$ to calculate the radius, r , of the plate. (3)

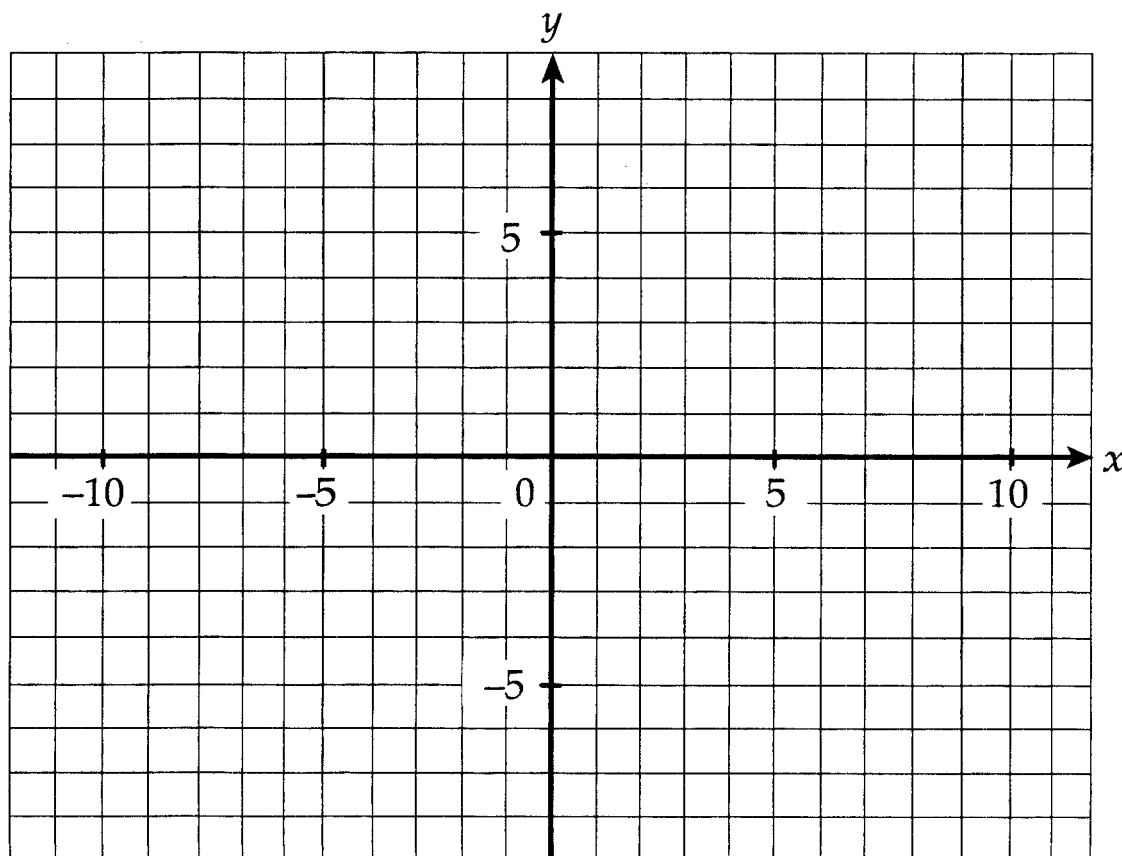
- (b) Can 3 of these plates be cut from a sheet of metal measuring 60 centimetres by 21 centimetres?
Give a reason for your answer. (4)



part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
(a)	3	3.1.1			3				R	1997 General Qu. 16
(b)	4	0.1			4			NR		

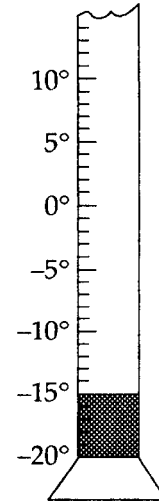
<ul style="list-style-type: none"> •¹ $r = \sqrt{\frac{340}{\pi}}$ •² $r = \sqrt{108.2\dots}$ •³ $r = 10.4 \text{ cm}$ 	<ul style="list-style-type: none"> •⁴ strategy: know to use linear strategy (•⁵) diameter = 20.8 (•⁶) width of 3 circles = 62.4 (•⁷) no since $62.4 > 60$
---	---

G97/7
p.29



The temperature recorded at 6am in Aviemore is shown on the diagram.

- (a) By 9am, the temperature had risen to -7°C .
By how many degrees had the temperature risen? (1)
- (b) By 2pm, the temperature had risen by a further 9 degrees.
What was the temperature at 2pm? (1)



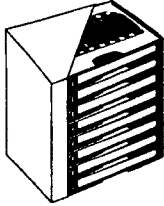
part	marks	Content ref.	non-calc		calc		calc neut		R/NR		Source 1998 General Qu. 1
			C	A/B	C	A/B	C	A/B			
(a)	1	2.1.2					1		R		
(b)	1	2.1.2					1		R		

- ¹ 8
- ² 2°C

One video costs £13.50.
On special offer is a set of 8 videos costing £104.

- (a) How much is saved by buying the set? (2)
- (b) Express the saving as a percentage of the cost of 8 single videos. (2)

1 VIDEO – £13.50



SPECIAL OFFER

8-VIDEO SET – £104

part	marks	Content ref.	non-calc		calc		calc neut		R/NR		Source 1998 General Qu. 2
			C	A/B	C	A/B	C	A/B			
(a)	2	1.4.1			2	2			R		
(b)	2	1.1.2				2			R		

- ¹ $\pounds 13.50 \times 8 = \pounds 108$
- ² $\pounds 108 - \pounds 104 = \pounds 4$
- ³ $\frac{4}{108}$
- (•⁴) $\frac{4}{108} \times 100 = 3.7$ (•⁴) means award •⁴ for multiplying •³ by 100

To raise money for its funds, a school organises a competition. In this competition, each person selects 10 football teams. Points are awarded as follows:

Win : 3 points	Score Draw : 2 points	No-score Draw : 1 point	Loss : 0 points
----------------	-----------------------	-------------------------	-----------------

Prizes are awarded for 27 points or more.

One way of winning a prize is shown in this table:

No. of teams getting 3 points	No. of teams getting 2 points	No. of teams getting 1 point	No. of teams getting 0 points	Total no. of points
9	0	1	0	28

Find 6 further ways of winning a prize.

(4)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
.	4	0.1					4		NR	1998 General Qu. 3
• ¹		any 1 line correct					10	0	0	30
• ²		any 1 further line correct					9	1	0	29
• ³		any 2 further lines correct					9	0	0	27
• ⁴		any 2 further lines correct					8	2	0	28
• ⁴		remaining 2 lines correct					8	1	1	27
							7	3	0	27

Michael's monthly salary is £720.

He spends $\frac{1}{5}$ of this on his mortgage, $\frac{3}{20}$ on his car and $\frac{1}{10}$ on insurance.

He uses the remainder for his household expenses.

(a) How much money does he spend on his car each month?

(1)

(b) What fraction of his monthly salary does he use for household expenses?

(2)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
(a)	1	1.4.1					1		R	1998 General Qu. 4
(b)	2	0.1					2		R	

- ¹ $\frac{3}{20} \times 720 = £108$
- ² $\frac{1}{5} + \frac{3}{20} + \frac{1}{10} = \frac{9}{20}$ or $108 + 144 + 72 = £324$
- ³ $\frac{11}{20}$ or $\frac{396}{720}$

(a) Scott goes on holiday to Spain.
He buys a camera costing 9900 pesetas.
How much is this in pounds sterling?

(b) The same camera costs 121.9 marks in Germany
and 18531 drachmas in Greece.
In which of the three countries is the camera
cheapest?

Exchange Rates for £1 sterling

France	8.92 francs
Germany	2.65 marks
Greece	426 drachmas
Italy	2650 lire
Spain	220 pesetas

(2)

(3)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
(a)	2	1.4.3				2			R	1998 General Qu. 5
(b)	3	1.4.3				3			R	

- ¹ $\frac{9900}{220}$
- ² £45.00
- ³ Ger: $\frac{121.9}{2.65} = £46$
- ⁴ Gre: $\frac{18531}{426} = £43.50$
- (•⁵) Greece

Solve algebraically the inequality $7y + 3 < 24$.

(2)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR		Source 1998 General Qu. 6
			C	A/B	C	A/B	C	A/B			
.	2	3.1.6	2						R		

•¹ $7y < 21$

(•²) $y < 3$

New York time is 5 hours behind British time.
When it is 7pm in Britain, it is 2pm in New York.



- (a) At 10am Gordon, who is in New York, phones home to Britain.
What time is it in Britain?

(1)

- (b) Los Angeles time is 3 hours behind New York time.
From Los Angeles, Fiona needs to phone a colleague in Aberdeen before 6pm, British time.
She makes the phone call at 9.30am, Los Angeles time.
Does she meet the 6pm deadline?
Give a reason for your answer.

(4)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR		Source 1998 General Qu. 7
			C	A/B	C	A/B	C	A/B			
(a)	1	2.2.3	1						R		
(b)	4	2.2.3 0.1		3					NR		

•¹ 3pm

•² LA is 8 hours behind GB

•³ 9.30am + 8hours or 6pm - 8hours

•⁴ 5.30pm or 10am

(•⁵) yes since 5.30pm is before 6pm

The table below shows the distance in miles between different places in Scotland.

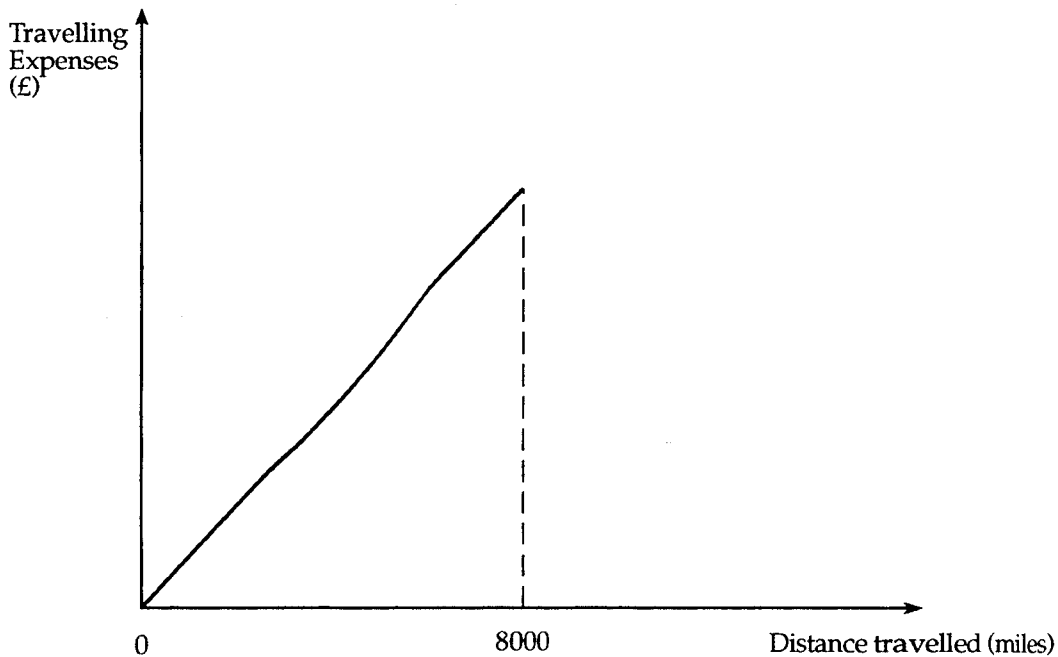
					Edinburgh
48					Glasgow
158	165				Inverness
45	62	113			Perth
56	8	173	70		Paisley
124	85	250	145	75	Stranraer

(a) Use the table to find the distance from Edinburgh to Paisley. (1)

(b) Allan is a salesman whose office is in Edinburgh. He gets travelling expenses at the rate of 27.5 pence per mile. On Monday he travels from Edinburgh to Paisley and back. How much does he get in travelling expenses? (2)

(c) Each year, **after** he has travelled 8000 miles, Allan's expenses are reduced to 16.2 pence per mile. In 1997, Allan travelled 9200 miles altogether. What were his **total** travelling expenses for 1997? (3)

(d) This graph shows, for part of 1997, the relationship between Allan's travelling expenses and the distance travelled. Complete the graph for the remainder of 1997. (2)



part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
(a)	1	0.1			1				R	1998 General Qu. 9
(b)	2	1.1.6			2				R	
(c)	3	1.1.6			2				R	
(d)	2	0.1				1			NR	

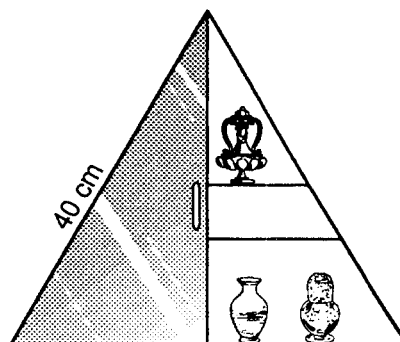
• ¹	56 miles	• ⁴	$8000 \times 27.5 = \pounds 2200$	• ⁷	extension with smaller +ve gradient
(• ²)	$2 \times 56 = 112$	• ⁵	$1200 \times 16.2 = \pounds 194.40$	• ⁸	inserting 9200
(• ³)	$112 \times 27.5 = \pounds 30.80$	• ⁶	total = $\pounds 2394.40$		

- (a) Tamara, Eva and Katrina are sisters.
 Eva and Katrina are twins.
 Tamara is 3 years older than the twins.
 The total of the sisters' ages is 42 years.
 Form an equation using the above information. (2)
- (b) Solve the equation to find Tamara's age. (2)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR		Source 1998 General Qu. 10
			C	A/B	C	A/B	C	A/B			
(a)	2	0.1		2					NR		
(b)	2	3.1.5	2						R		

- ¹ twins be x years, Tam is $x+3$ years
- ² $x+x+x+3=42$
- ³ $3x=39$ so $x=13$
- ⁴ Tam is 16

A wall display cabinet is made in the shape of an equilateral triangle with length of side 40 centimetres.
 One half of the cabinet has shelves; the other half has a glass door.

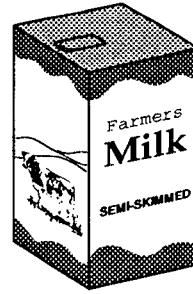


- (a) Calculate the height of the cabinet. (4)
- (b) Find the area of the glass door. (2)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR		Source 1998 General Qu. 11
			C	A/B	C	A/B	C	A/B			
(a)	4	2.3.1						4	NR		
(b)	2	1.2.1			2				R		

- ¹ $r/a \Delta$ base = 20 (•⁵) $\frac{1}{2} \times 20 \times 34.64$
- ² $40^2 = 20^2 + h^2$ (•⁶) 346.4 cm^2
- ³ $h^2 = 1200$
- ⁴ $h = \sqrt{1200} = 34.64$

A milk carton is in the shape of a cuboid with a square base.
The sides of the base are 8 centimetres long.



(a) The volume of the carton is 1280 cubic centimetres.
What is the height of the carton? (2)

(b) A second cuboid carton, which also has a square base, holds
1.75 litres of milk.
The height of this carton is 25cm.
Find the length of the base. (3)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR		Source 1998 General Qu. 12
			C	A/B	C	A/B	C	A/B			
(a)	2	1.2.2				2			NR		
(b)	3	1.2.2				3			NR		

• ¹	$h = \frac{1280}{64}$	• ³	$1750 = L^2 \times 25$
• ²	$h = 20$	• ⁴	$L^2 = \frac{1750}{25}$
		• ⁵	$L = 8.4$

Factorise $15w + 6st$

(2)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR		Source 1998 General Qu. 13
			C	A/B	C	A/B	C	A/B			
.	2	3.1.4	2						R		

• ¹	$3 \times \dots$
• ²	$\dots \times (5w + 2st)$

Superbuy Stores have a Friendly card which allows a shopper to collect points for money spent. One point is given for each whole £1 spent.

- (a) Anjum spends £27.26 in a Superbuy Store.
Complete his till receipt.

Previous points	1367
Points this sale
Total Points

(2)

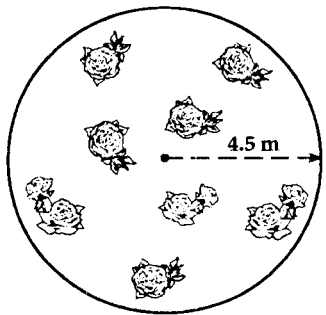
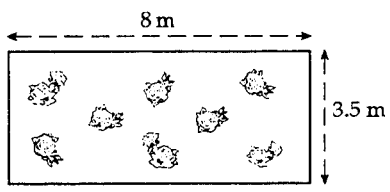
- (b) When you buy petrol from Superbuy, you get 3 points for every £5 spent.
Points may be exchanged for goods.
How much must be spent on petrol to obtain a personal stereo worth 380 points?

(3)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
(a)	2	1.4.1					2		R	1998 General Qu. 14
(b)	3	0.1					3	NR	NR	

• ¹	27	• ³	$\frac{380}{3} = 126.667$
• ²	$1367 + 27 = 1394$	• ⁴	127
		• ⁵	$127 \times 5 = £635$

In the park, two new flower beds are being planted with roses.
One flower bed is rectangular and measures 8 metres by 3.5 metres.
The other is circular with a radius of 4.5 metres.



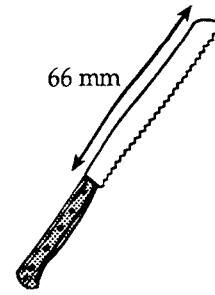
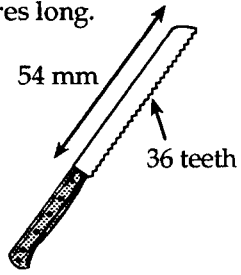
- (a) A fence is to be put around each flower bed.
Find the **total** length of fencing required. (3)
- (b) Fencing is sold by the metre.
What is the minimum length of fencing which must be bought? (1)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
(a)	3	0.1			1				R	1998 General Qu. 16
		1.2.3			2					
(b)	1	1.1.3			1				NR	

• ¹	Perimeter = 23m	• ³	Total = 51.274
• ²	Circumference = 28.274m	(• ⁴)	52m

The blade of a knife is 54 millimetres long.

The blade has 36 teeth.



The blade of a larger knife is 66 millimetres long.

The ratio $\frac{\text{number of teeth}}{\text{length of blade}}$ is the same for both knives.

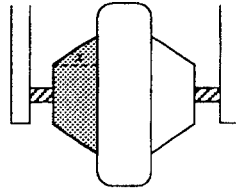
How many teeth does the larger knife have?

(2)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR		Source 1998 General Qu. 18
			C	A/B	C	A/B	C	A/B			
.	2	1.1.4				2			R		

- ¹ $66 \times \frac{36}{54}$
- ² 44

The design of a trolley wheel is shown.



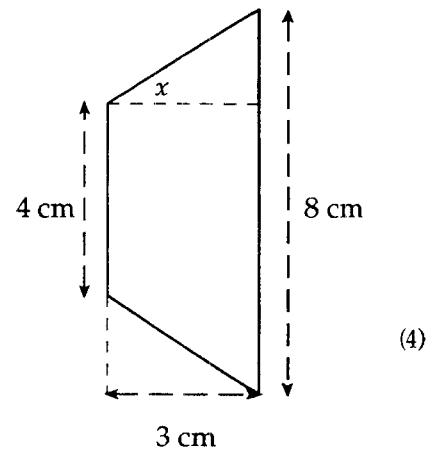
The manufacturer requires that angle x must be more than 32° .

Part of this design has measurements as shown.

Do these measurements satisfy the manufacturer's requirements?

Give a reason for your answer.

Do not use a scale drawing.

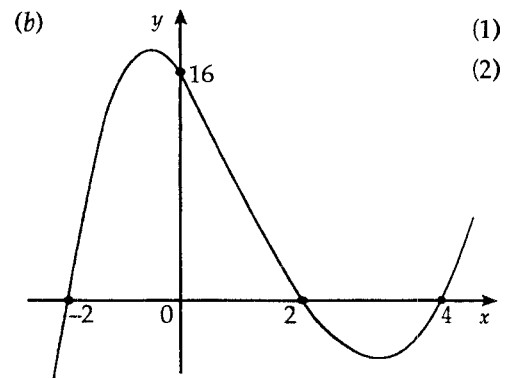
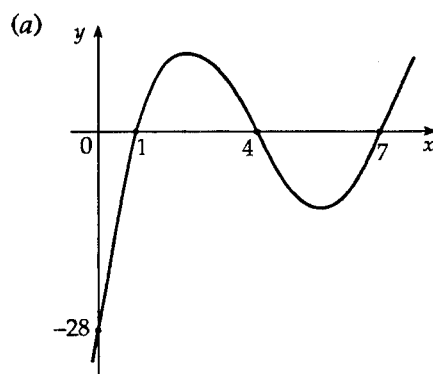
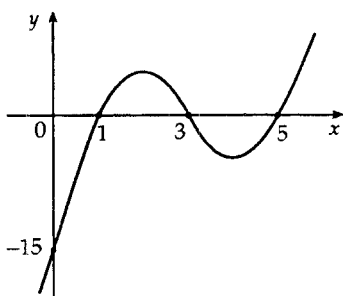


part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
.	4	3.3.1 0.1			3	1			NR	1998 General Qu. 19

- ¹ know to use 2 and 3
- ² $\tan x^\circ = \frac{2}{3}$
- (•³) $x = 33.69$
- (•⁴) yes since $33.69 > 32$

The first diagram shows the graph whose equation is $y = (x - 1)(x - 3)(x - 5)$.

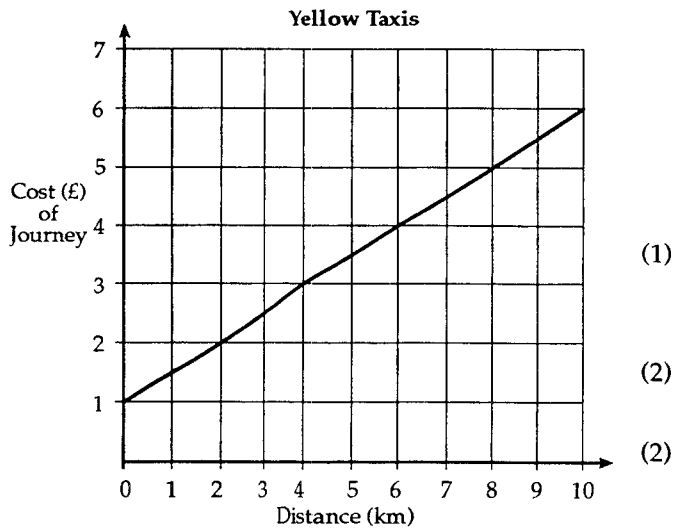
Write down an equation for each of the other two graphs.



part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
(a)	1	0.1	1						NR	1998 General Qu. 20
(b)	2	0.1	2						NR	

- ¹ $y = (x - 1)(x - 4)(x - 7)$
- ² $(x - 2)(x - 4)$
- ³ $(x + 2)$

The cost of hiring a Yellow Taxi consists of a basic charge plus a charge per kilometre. The cost of journeys up to 10 kilometres is shown in the graph below.



- (a) How much is the basic charge? (1)
- (b) How much do Yellow Taxis charge per kilometre? (2)
- (c) Find the cost of a 12 kilometre taxi journey. (2)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR		Source 1999 General Qu. 1
			C	A/B	C	A/B	C	A/B			
(a)	1	2.4.1					1		R		
(b)	2	2.4.1					2		R		
(c)	2	2.4.1					2		R		

• ¹	(£)1				(^{•4})	(1)+12×(50)		(^{•4})	means answers should be consistent with previous working (i.e. not necessarily £1 and 50p)		
• ²] 50(p)] means the 50(p) is			(^{•5})	(£)7					
• ³]]] awarded 2 marks									

Mr and Mrs Donaldson are having a party to celebrate their 25th Wedding Anniversary. They want to buy Champagne. They see this sign in a shop window.

CHAMPAGNE

£24.99 per bottle

15% Discount when you buy 6 bottles

Calculate the cost of 6 bottles.

(3)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR		Source 1999 General Qu. 2
			C	A/B	C	A/B	C	A/B			
.	3	1.1.1			2				R		
		1.4.1			1						

• ¹	6×24.99=149.94										
• ²	$\frac{15}{100} \times 149.94 = 22.49$										
• ³	149.94-22.49=127.45										

Ticketmasters Call Centre can handle 240 calls for concert tickets every 2 hours.
How many calls can they handle in 45 minutes?

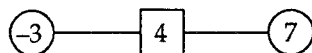
(2)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR		Source 1999 General Qu. 4
			C	A/B	C	A/B	C	A/B			
.	2	1.1.6			2				R		

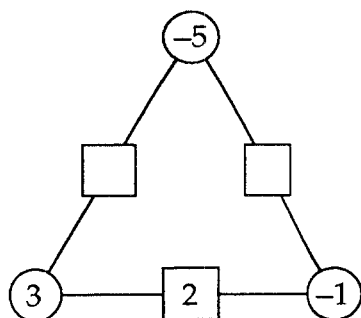
- ¹ strategy: e.g. find calls in 15 minutes
- ² $\frac{240}{8} \times 3 = 90$

Rule:

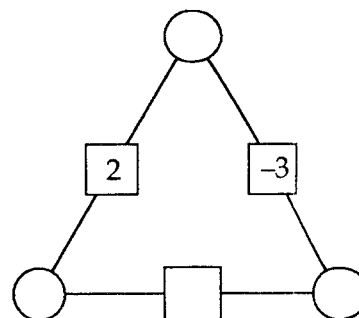
The number in the square is the sum of the numbers in the circles on either side of it.



(a) Use this rule to complete the first diagram.



(b) Using the rule, enter the numbers -2, -1, 1, and 3 in the second diagram.



(2)

(2)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR		Source 1999 General Qu. 6
			C	A/B	C	A/B	C	A/B			
(a)	2	2.1.2					2		R		
(b)	2	2.1.2					2		NR		

- ¹ -2 in left box
- ² -6 in right box
- ³ one complete side
3, 2, -1 **or** -2, -3, -1
- ⁴ -1 at top, 3, 2, -1 along base

Two lenders, Mortgages Direct and Leading Mortgage, offer mortgages at different rates on a loan of £45 000.

<i>Mortgages Direct</i>	
Monthly payment	£330.50
Plus	
One-off set-up fee	£500

<i>Leading Mortgage</i>	
Monthly payment	£349.90
And	
No other fees to pay	

Which mortgage would be better value over a period of 3 years and by how much?

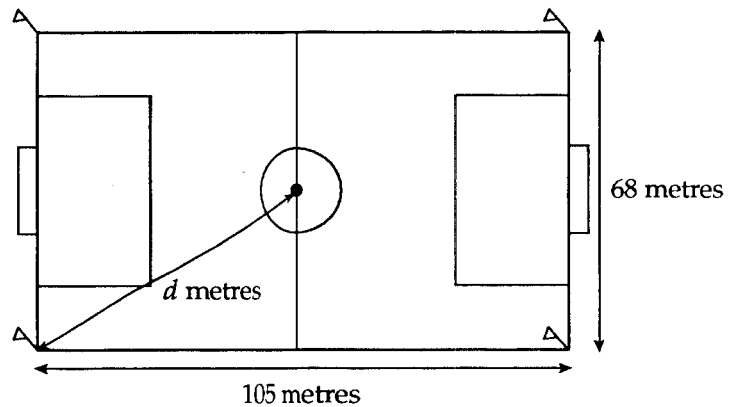
(5)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
.	5	1.4.1			4				R	1999 General Qu. 7

• ¹	330.50×36	(• ⁴)	MDirect better by £198.40
(• ²)	$500 + 330.50 \times 36$	• ⁵	all calcs correct: £11898, £12398, £12596.40
• ³	349.90×36		

A football pitch used in the Premier League measures 105 metres by 68 metres.

Find the distance, d metres, from the corner flag to the centre spot.



(4)

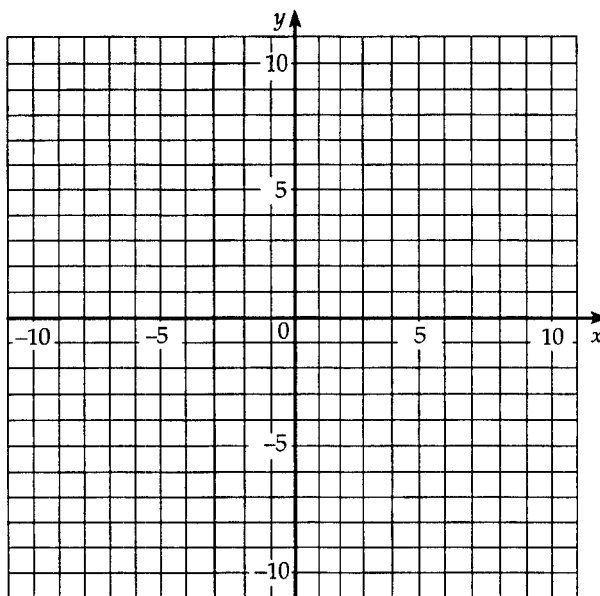
part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
.	4	2.3.1 0.1			3	1			R	1999 General Qu. 8

• ¹	$\frac{105}{2}$ and $\frac{68}{2}$
• ²	$d^2 = 52.5^2 + 34^2$
• ³	3912.25
(• ⁴)	62.5

- (a) Complete the table below for $y = 3x + 1$.

x	-3	0	3
y			

- (b) Using the table in part (a), draw the graph of the line $y = 3x + 1$ on the grid.



(2)

(2)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR		Source 1999 General Qu. 9
			C	A/B	C	A/B	C	A/B			
(a)	2	3.2.2	2						R		
(b)	2	3.2.2	2						R		

•¹ any 1 point correct in table

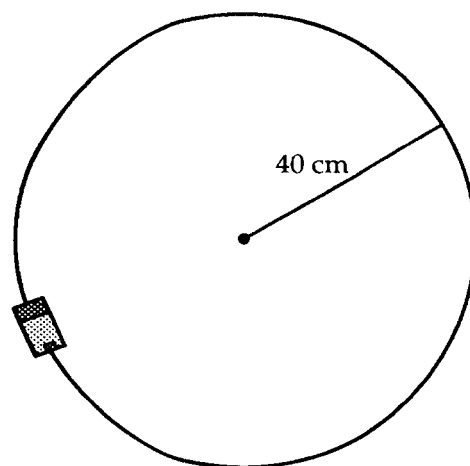
•² any further 2 points correct in table

x	-3	0	3
y	-8	1	10

(•³) plotting 3 points

•⁴ drawing st line thr' 3 the points

A battery operated toy train travels on a circular track. The radius of the circle is 40 centimetres. It takes one minute for the train to travel 8 times round the track.



- (a) How far does the train travel in one minute? Give your answer to the nearest 10 centimetres.

- (b) Find the speed of the train in centimetres per second.

(4)

(2)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR		Source 1999 General Qu. 11
			C	A/B	C	A/B	C	A/B			
(a)	4	1.2.3 1.1.4			1	3			R		
(b)	2	2.2.4				2			R		

•¹ $C = \pi \times 80$

•² $C = 251.3$

(•³) $8 \times 251.3 = 2010.6$

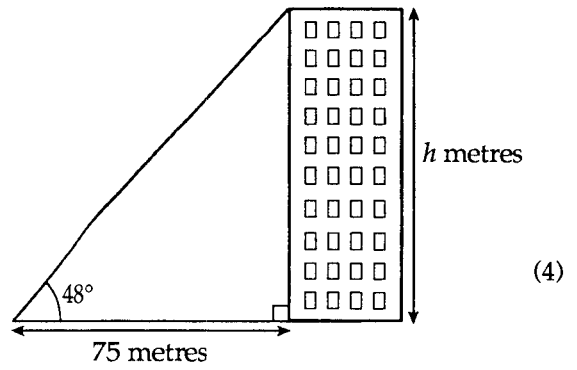
(•⁴) 2010 (cm)

(•⁵) $2010 \div 60$

(•⁶) 33.5 (cm / sec)

The angle of elevation from the ground to the top of a block of flats is 48° .
 The angle is measured at a point 75 metres from the flats as shown in the diagram.

Calculate the height, h metres, of the block of flats, correct to 1 decimal place.



part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
.	4	3.3.1 1.1.5			3 1				R	1999 General Qu. 12

• ¹] $\tan 48^\circ = \frac{h}{75}$
• ²]
• ³	$h = 75 \tan 48^\circ$
• ⁴	$h = 83.3 \text{ (m)}$

(a) Multiply out the brackets and simplify $2a + 3(4a - 5)$. (2)

(b) Solve **algebraically** the equation $4x - 3 = x + 5$. (3)

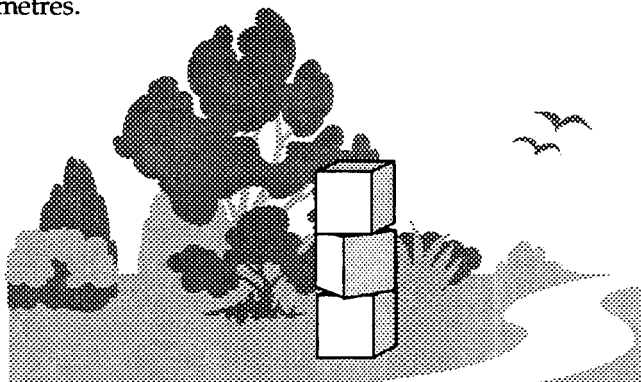
part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
(a)	2	3.1.3	2						R	1999 General Qu. 14
(b)	3	3.1.5	3						R	

• ¹	$12a - 15$	• ³	$3x$
• ²	$14a - 15$	• ⁴	8
		(• ⁵)	$x = \frac{8}{3}$

A sculpture is to be made by stacking three blocks of stone. Each block of stone is a cube of side (1.2 ± 0.05) metres.

What is the maximum height of the sculpture?

(2)



part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
.	2	0.1					2		R	1999 General Qu. 16

• ¹	$1.2 + 0.05 = 1.25$
• ²	$3 \times 1.25 = 3.75 \text{ (m)}$

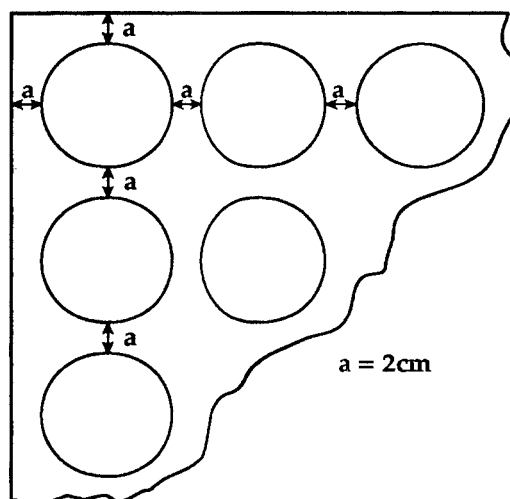
A pattern of circular discs of diameter 6 centimetres is to be cut from a square sheet of plastic.

The diagram shows part of this sheet.

Note that $a = 2$ cm.

(a) How many circular discs could be cut from a square sheet of plastic of side 50 centimetres?

(b) Find the area of plastic remaining after the discs have been cut from the square sheet.



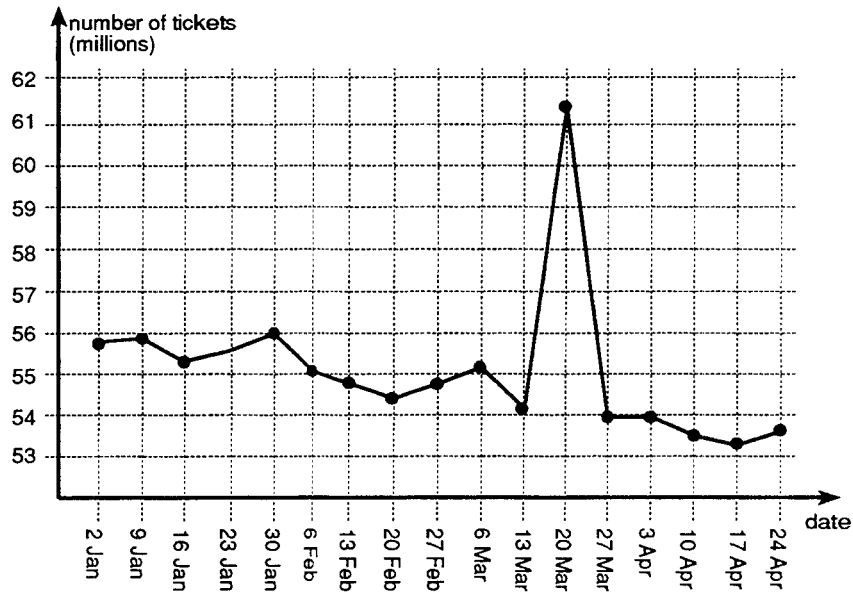
(3)

(4)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
(a)	3	0.1				3			NR	1999 General Qu. 17
(b)	4	1.2.1			2	2			NR	

• ¹	$\frac{50-2}{8}$	• ⁴	$A = 3.14 \times 9$
• ²	6	(• ⁵)	$36 \times A$
• ³	$6^2 = 36$	(• ⁶)	Rectangle $- 36 \times A$
		(• ⁷)	≥ 3 correct calcs: 28.26, 1017.36, 2500, 1482.62

The diagram below shows the number of National lottery tickets sold for each Saturday draw in the first four months of 1999.

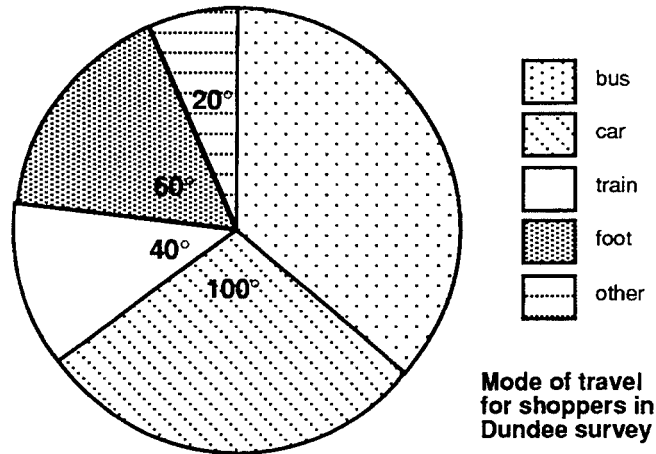


- (a) For how many draws were the lottery ticket sales above 55 million? (1)
- (b) On a 'rollover' week, prize money from a previous draw is carried over. On which Saturday did this occur?
Estimate the ticket sales for this draw to the nearest million. (2)
- (c) Describe the trend in lottery ticket sales shown in the graph. (1)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
(a)	1	2.4.1					1		R	Qu. 1
(b)	2	2.4.1					2		R	
(c)	1	2.4.3					1		R	

- ¹ 8
- ² 20 March
- ³ 61 or 62
- ⁴ downward

In a survey of shoppers in Dundee city centre, shoppers were asked how they had travelled into town. The results are shown in the pie chart.



- (a) Find the size of the angle of the sector representing bus travel. (1)
- (b) What fraction of shoppers travelled to Dundee by foot? (1)
- (c) Of the 270 shoppers surveyed, how many travelled by car? (2)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
(a)	1	2.4.1			1				R	Qu. 2
(b)	1	2.4.1			1				R	
(c)	2	2.4.1				2			R	

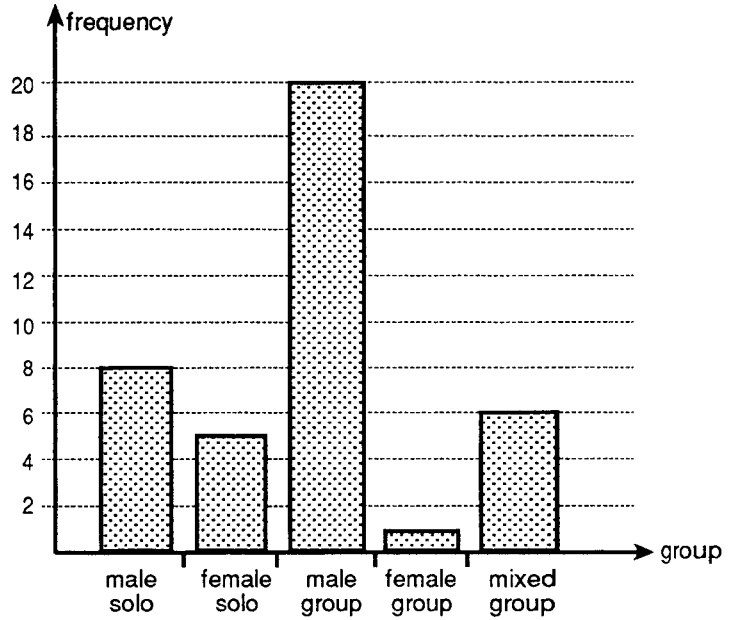
•¹ 140°

•² $\frac{60}{360}$ or $\frac{1}{6}$

•³ ... $\times \frac{100}{360}$

•⁴ 75

The bar chart shows the make up of a top singles chart for a week in July, 1999.



- (a) What was the most popular type of single? (1)
- (b) How many female solos were there? (1)
- (c) How many singles were in the chart? (2)
- (d) What percentage of the singles were sung by a male group? (1)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
(a)	1	2.4.1					1		R	Qu. 3
(b)	1	2.4.1					1		R	
(c)	2	2.4.1					2		R	
(d)	1	1.1.2						1	R	

•¹ male group

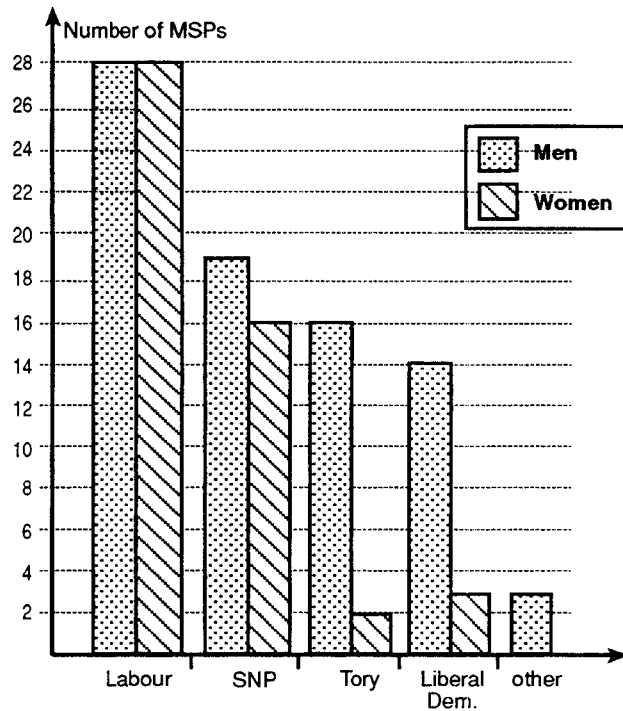
•² 5

•³ 8, 5, 20, 1, 6

•⁴ 40

•⁵ 50%

The diagram shows the make up of the Scottish Parliament which was elected in May 1999.



- (a) How many elected Members of the Scottish Parliament (MSPs) were Labour? (1)
- (b) How many women MSPs were elected? (2)
- (c) The Green Party, the Scottish Socialist Party and Independents (all grouped together as 'Other' in the diagram) each gained the same number of representatives. How many Green party MSPs were elected? (1)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
(a)	1	2.4.1					1		R	Qu. 4
(b)	2	2.4.1					2		R	
(c)	1	2.4.1						1	NR	

- ¹ 56
- ² 28, 16, 2, 3 in any order
- ³ 49
- ⁴ 1 (accept 3÷3)

A delivery man recorded his daily mileage for each working day of one month. The table below shows his records.

Sun	Mon	Tues	Wed	Thur	Fri	Sat
-	-	45	38	66	46	-
-	54	54	39	42	75	-
-	48	56	46	59	69	-
-	52	52	44	62	70	-
-	54	50	38	61	-	-

- (a) Construct a stem-and-leaf diagram to show his monthly mileage. (3)
- (b) What was his median mileage? (3)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
(a)	3	2.4.2					3		R	Qu. 5
(b)	3	2.5.1					3	R		

•¹ e.g. 318 means 38 miles

•² $\begin{array}{l|l} 3 & \\ 4 & \\ 5 & \\ 6 & \\ 7 & \end{array}$

•³ $\begin{array}{l|l} 3 & 8\ 8\ 9 \\ 4 & 2\ 4\ 5\ 6\ 6\ 8 \\ 5 & 0\ 2\ 2\ 4\ 4\ 4\ 6\ 9 \\ 6 & 1\ 2\ 6\ 9 \\ 7 & 0\ 5 \end{array}$

[accept unordered leaves]

•⁴ ordered stem - & - leaf

•⁵ $\frac{23+1}{2}$ or 12th term

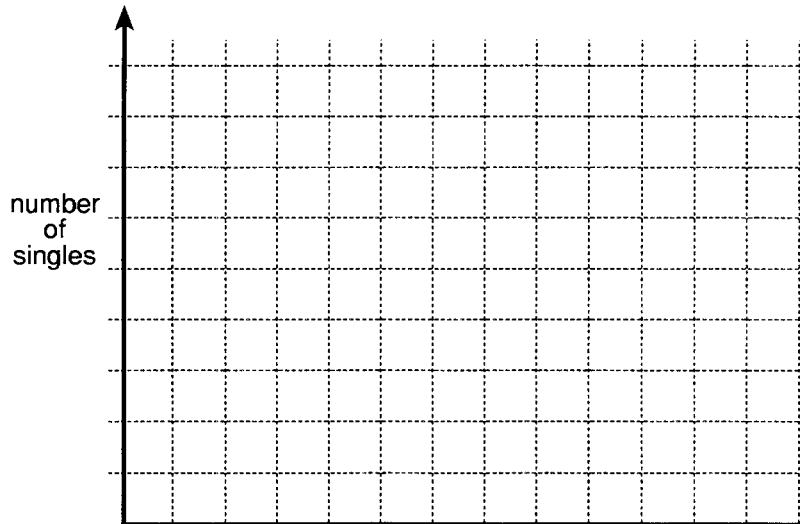
•⁶ 52

In an article in a magazine, the following information was given about the top-twenty singles chart for the week ending 5th June 1999.

male solo	female solo	male groups	female groups	mixed groups
2	4	8	1	5

(a) Draw a bar chart on the grid below to illustrate this information.

(3)

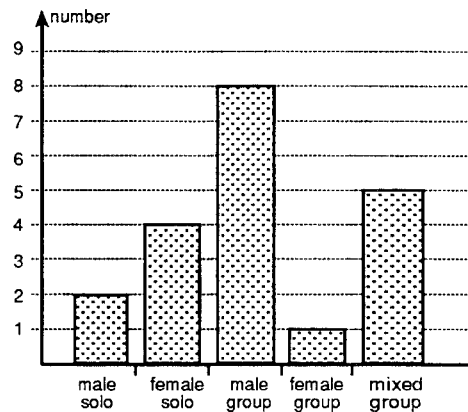


(b) What would be a suitable title for this bar chart?

(1)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
(a)	3	2.4.2					3		R	Qu. 6
(b)	1	2.4.2					1		R	

- ¹ vertical scale of 0 → 8
- ² five suitable labels
- ³ heights as per table
- ⁴ Top 20 singles, June 5th 1999



Lynsey and Simon each collected information about the heights and weights of their friends. They calculated the mean and range of the results.

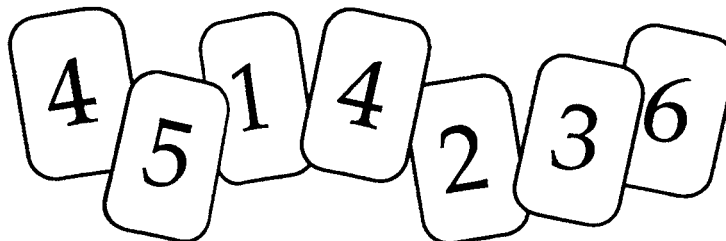
	<i>mean</i>	<i>range</i>
Lynsey's friends	height: 170cm	15cm
	weight: 47kg	3kg
Simon's friends	height: 180cm	20cm
	weight: 56kg	19kg

- (a) Compare the heights of the two groups of friends. (2)
- (b) The weight of one of the friends was 51kg. Is it more likely to be Lynsey's friend or Simon's? Explain why. (2)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
(a)	2	2.5.3						2	R	Qu. 7
(b)	2	2.5.3						2	NR	

- ¹ *cf mean*: e.g. Lynsey's friends shorter on average
- ² *cf range*: e.g. range of Simon's friends greater
- ³ Simon's friend
- ⁴ weight range of Lynsey's friends excludes the '51'

Brenda has 7 cards. The cards are numbered as shown.



Brenda chooses one card at random.

What is the probability of her getting a '6'?

(2)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
.	2	2.5.4						2	R	Qu. 8

- ¹ $\frac{\dots}{6}$
- ² $\frac{1}{\dots}$

An investor bought shares in a particular company on the Stock Market at 50p per share. She kept a record of the share price over a period of ten weeks. The share prices are shown below.

week	1	2	3	4	5	6	7	8	9	10
share price	50p	48p	48p	45p	46p	45p	45p	43p	40p	39p

(a) Complete the line graph to illustrate the share price over the ten weeks.

(2)

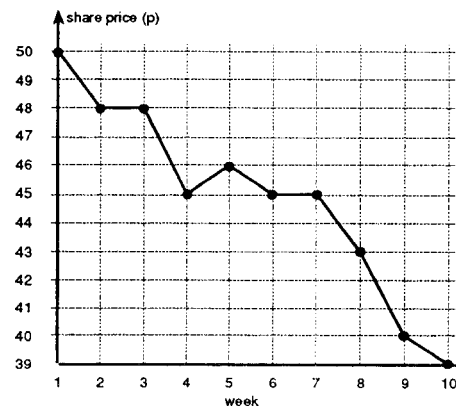


(b) She decided to sell the shares if the price of the share dropped by more than 10% of its original value. In which week did she sell the shares?

(2)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
(a)	2	2.4.2	2						R	Qu. 9
(b)	2	2.4.1		2					NR	

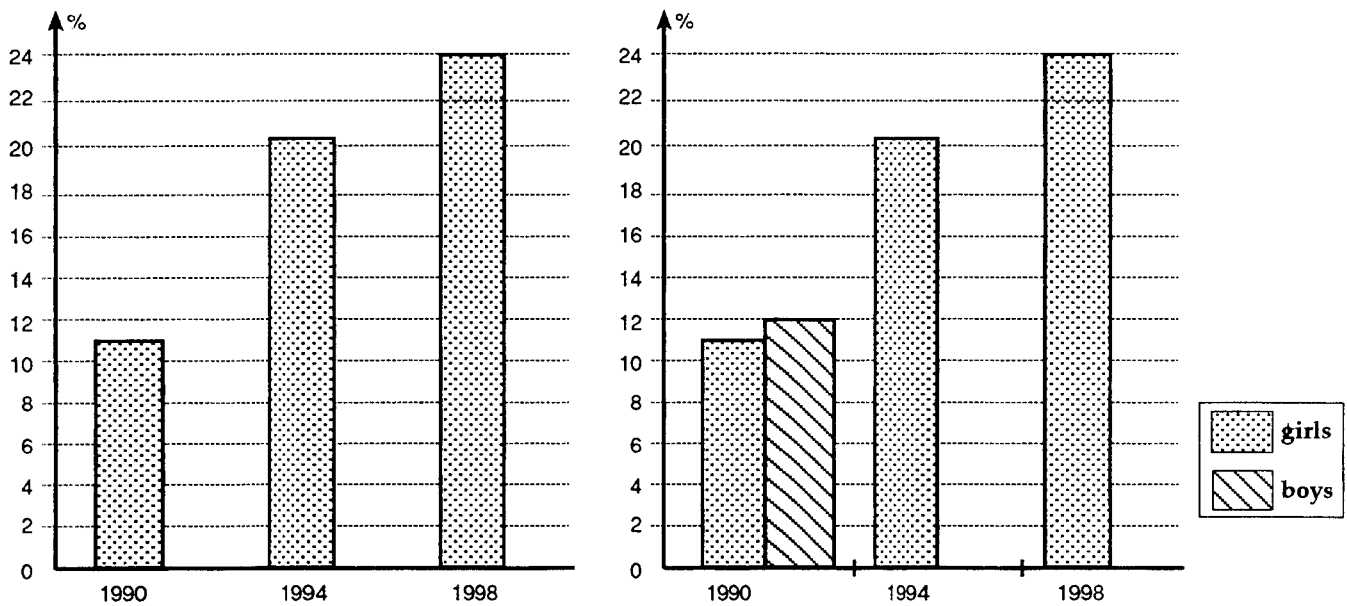
- ¹ all points correct
- ² all points joined
- ³ 5, 45 or 50×0.1 etc
- ⁴ (week) 8



The number of 15 year old girls who say they smoke every day has doubled in the last eight years according to a recent report on health behaviours of Scottish schoolchildren.

(a) Use the information on the bar chart on the left to justify this claim.

(2)



(b) The corresponding figures for 15-year old boys who are daily smokers are as follows.

Add this information to the bar chart on the right.

Year	1990	1994	1998
%	12	17	19

(2)

(c) Complete the sentence:

Although a slightly higher percentage of 15 year old boys smoked daily than girls in 1990, by 1998

(1)

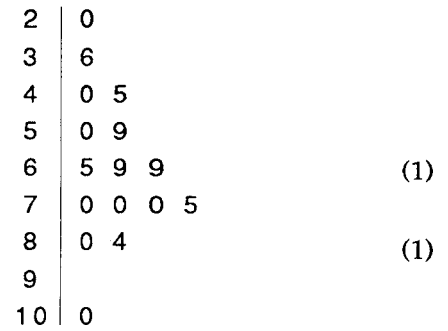
part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
(a)	2	2.4.1	2						NR	Qu. 10
(b)	2	2.4.2	2						R	
(c)	1	2.5.3		1					NR	

<p>a</p> <ul style="list-style-type: none"> •¹ use 11 and 24 •² $24 > 22$ or $24 > 11 \times 2$ <p>b</p> <ul style="list-style-type: none"> •³ heights at 17 and 19 •⁴ all bars same width and shaded <p>c</p> <ul style="list-style-type: none"> •⁵ more girls were smoking than boys 	
--	--

Nick is interested in buying a mobile phone. He visits lots of high street shops and summarises his findings in the stem-and-leaf diagram. It shows phone costs to the nearest £ of those phones in which he is interested.

- (a) How many phones cost more than £50?
 (b) What is the modal cost of this sample of phones?

Cost of mobile phones



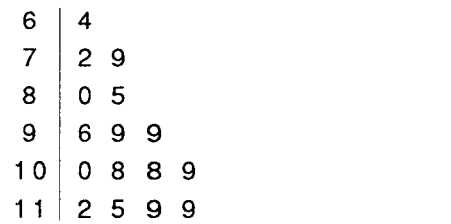
n=16

2 | 0 means £20

- (c) The minimum annual charges for different phones vary. They are shown to the nearest £ in the diagram opposite.

The cheapest mobile phone has the most expensive annual charges. What is the minimum total cost of this mobile phone for the first year?

Annual Charges



n=16

6 | 4 means £64

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
(a)	1	2.4.1	1						R	Qu.11
(b)	1	2.5.1	1						R	
(c)	2	2.4.1		2					NR	

<i>a</i>	• ¹	11	
<i>b</i>	• ²	70	
<i>c</i>	• ³	20 and 119	
	• ⁴	£139	

In a survey of some families, the number of children in each was recorded. The results are summarised in the following table.

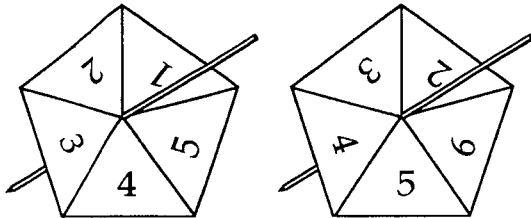
Number of children	0	1	2	3	4
Number of families	5	20	16	8	1

Calculate, as a decimal,

- (a) The mean number of children per family; (4)
 (b) the median, mode and range of this distribution. (3)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
(a)	4	2.5,2			4				R	Qu.12
(b)	3	2.5,2			3				R	

• ¹ (total no. of children =) 80	• ⁵ median = 1.5
• ² (total no. of families =) 50	• ⁶ mode = 1
• ³ $\frac{80}{50}$	• ⁷ range = 4 - 0 = 4
• ⁴ 1.6	



Two fair spinners are used for a game. The scores from each spinner are added together.

The table shows all the possible totals for the two spinners.

	1	2	3	4	5
2	3	4	5	6	7
3	4	5	6	7	8
4	5	6	7	8	9
5	6	7	8	9	10
6	7	8	9	10	11

What is the probability of scoring a total of 4?

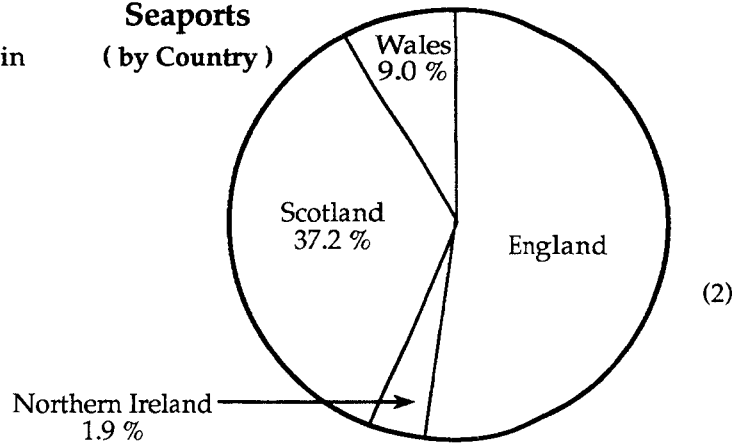
(2)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
.	2	2.5,4						2	NR	Qu.13

• ¹ $\frac{2}{25}$	• ² $\frac{2}{25}$
-------------------------------	-------------------------------

The pie chart shows the distribution of freight traffic travelling out of the UK through seaports in 1997.

Seaports
(by Country)



The tonnage travelling out the UK was 206.7 million tonnes. Calculate the total tonnage travelling from Scottish seaports, giving your answer correct to the nearest million tonnes.

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
.	2	2.4.1			2				R	Qu.14

<ul style="list-style-type: none"> •¹ 37.2% of 206.7 million •² 77 million
--

The speeds of some cars were recorded as they passed a certain point on a motorway. The speeds were (to the nearest mile per hour)

61 73 65 67 72 60 69 74 71 63 68

- (a) Find the mean speed, correct to 1 decimal place. (4)
- (b) Find the median speed and the range of the speeds. (4)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
(a)	4	2.5.1			4				R	Qu.15
(b)	4	2.5.1			4				R	

<ul style="list-style-type: none"> •¹ total = 743 •² number of 'recorded speeds' = 11 •³ $\frac{743}{11}$ •⁴ 67.5 mph 	<ul style="list-style-type: none"> •⁵ <i>strategy</i>: put in order (stated / implied by 68) •⁶ median = 68 •⁷ 60 and 74 •⁸ range = 74 - 60 = 14
--	--

A potter knows that only one out of five vases of a certain design is passed as suitable for firing.

What is the probability that a vase chosen at random will be rejected?

(2)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
.	2	2.5.4						2	R	Qu.16
<p>•¹ $\frac{\dots}{5}$ •² $\frac{4}{\dots}$</p>										

The total hours of sunshine during a ninety day period of winter, measured at a Scottish airport over the winters from 1987-88 to 1995-96, were

175 177 144 104 146 130 133 115 157

- (a) Calculate the mean total hours of sunshine, giving your answer correct to the nearest whole number. (4)
- (b) Write down
- (i) the median total hours of sunshine
- (ii) the range of the total hours of sunshine. (4)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
(a)	4	2.5.1			4				R	Qu.17
(b)	4	2.5.1			4				R	
<p>•¹ total of 'total hours' = 1281 •⁵ <i>strategy</i>: put in order (stated / implied by 144)</p> <p>•² number of recorded totals = 9 •⁶ median = 144</p> <p>•³ $\frac{1281}{9}$ •⁷ 104 and 177</p> <p>•⁴ 142 hours •⁸ range = 177 - 104 = 73</p>										

The atmospheric smoke pollution levels, measured in micrograms per cubic metre, in a number of Scottish towns on a particular day were

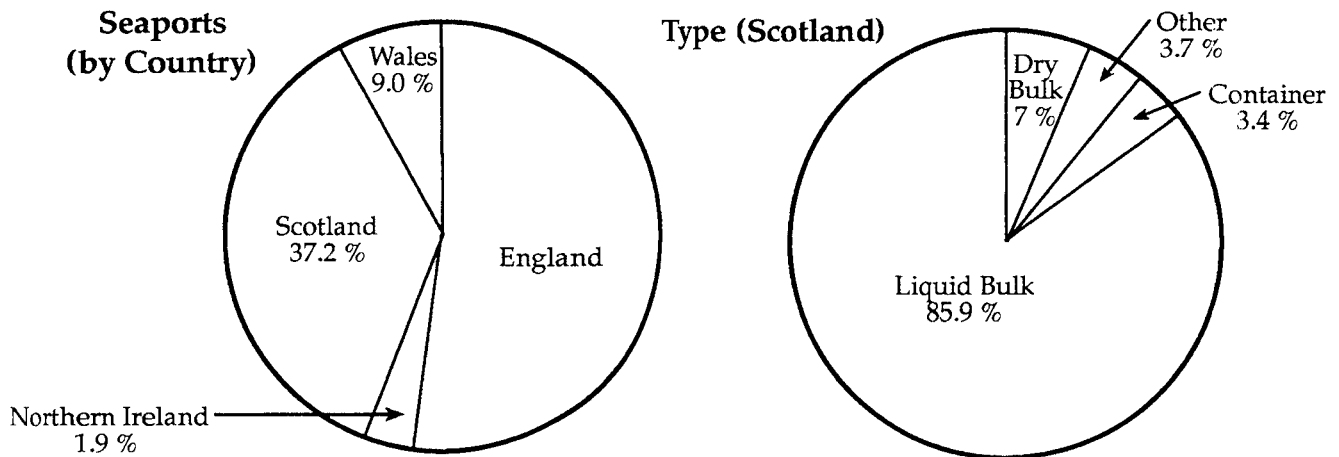
12 8 9 19 28 5 12 34 8

- (a) Write down
- (i) the median atmospheric smoke pollution
 - (ii) the range of these measurements. (4)
- (b) Calculate the mean atmospheric smoke pollution. (4)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
(a)	4	2.5.1			4				R	Qu.18
(b)	4	2.5.1			4				R	

• ¹	strategy: put in order(stated / implied by 12)	• ⁵	total of 'total hours' = 135
• ²	median = 12	• ⁶	number of measurements = 9
• ³	5 and 34	• ⁷	$\frac{135}{9}$
• ⁴	range = 34 - 5 = 29	• ⁸	15 (micrograms per cubic metre)

The following pie charts show the distribution of freight traffic travelling out of the UK through seaports in 1997 and by type for Scotland.

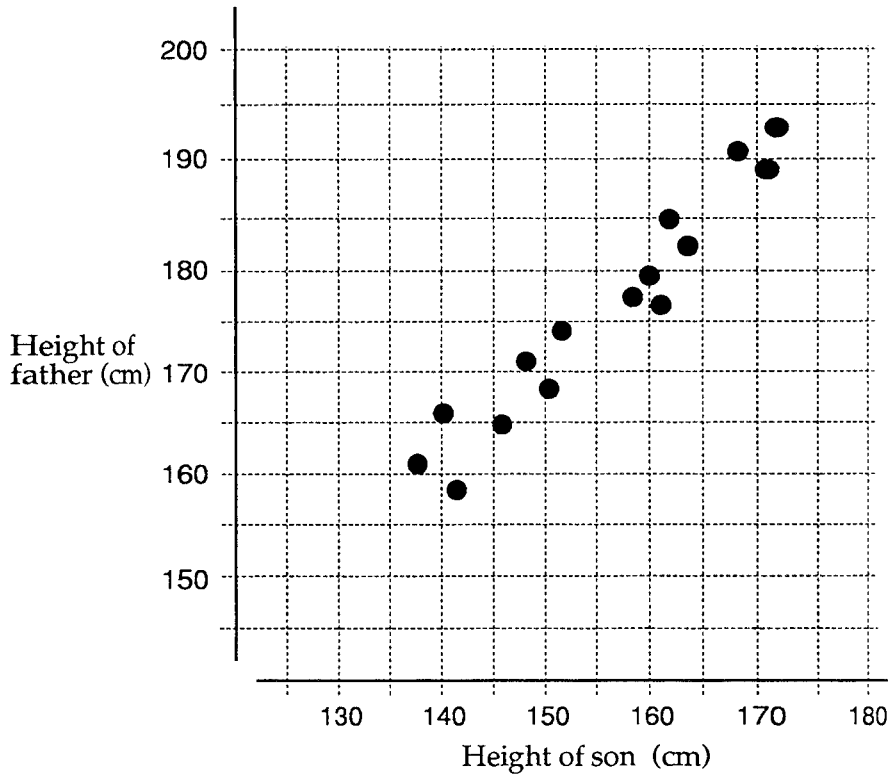


- (a) What percentage, to the nearest whole number, of this traffic travelled out of the UK through English seaports? (2)
- (b) What percentage, to the nearest whole number, of this traffic was of the type liquid bulk and travelled out of the UK through Scottish seaports? (2)

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
(a)	2	2.4.1			2				NR	Qu.19
(b)	2	2.4.1				2			NR	

- ¹ others total = 48.1%
- ² 51.9% ≈ 52%
- ³ 85.9% of 37.2%
- ⁴ 31.95% ≈ 32%

The scattergraph shows the heights of 16 S3 boys and their fathers.



- (a) What does the scattergraph tell you about the relationship between the heights of these boys and their fathers? (1)
- (b) Draw a best fitting straight line on the scattergraph. (1)
- (c) Bill, another S3 boy, is 155 cm tall. Use your line to estimate the height of Bill's father. (2)
(Show clearly on the diagram how you arrive at your answer).

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
(a)	1	2.4.5					1		R	Qu.20
(b)	1	2.4.6					1		R	
(c)	2	2.4.6					2		R	

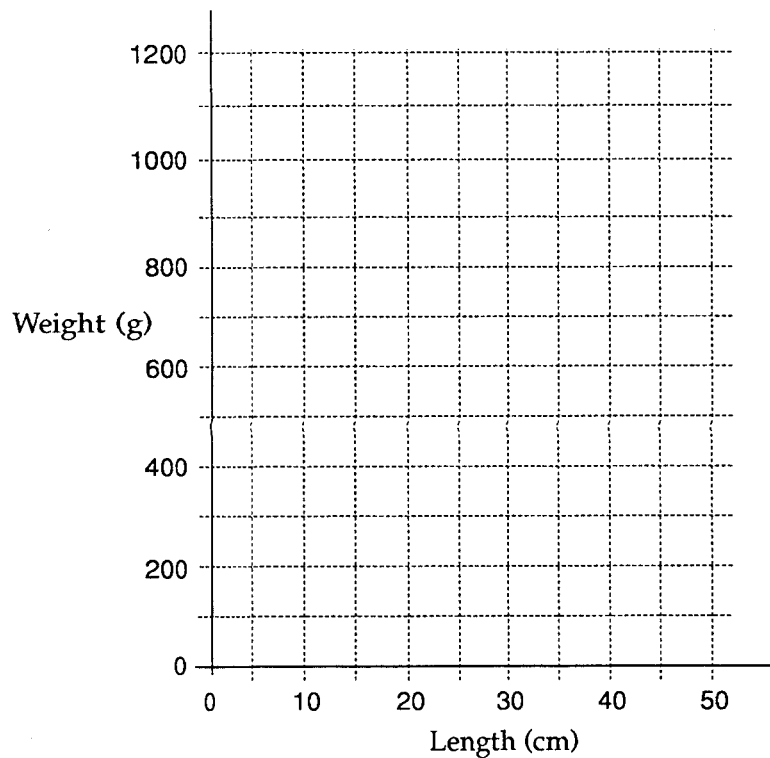
- ¹ strong positive **linear** relationship between heights
- ² drawing line
- ³ starting at 155 on x – axis going vertically
- ⁴ moving left horizontally after meeting line ≈ 175 cm

A research team visits a remote island. As part of a conservation exercise the weight and length of each of ten birds of one particular species are taken.

The data is shown in the table below.

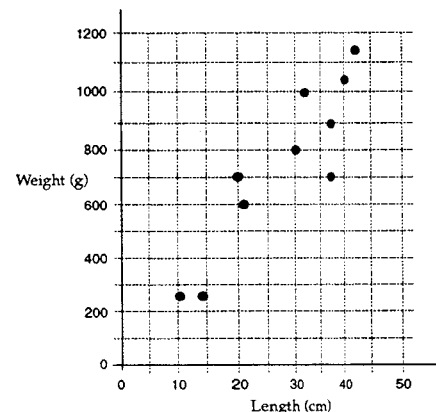
Length (cm)	11	14	20	21	30	32	37	37	40	42
Weight (g)	250	250	700	600	800	1000	700	850	1050	1150

- (a) Use the grid below to draw a scattergraph to illustrate this data. (2)
- (b) What does the scattergraph tell you about the heights and weights of these birds? (1)



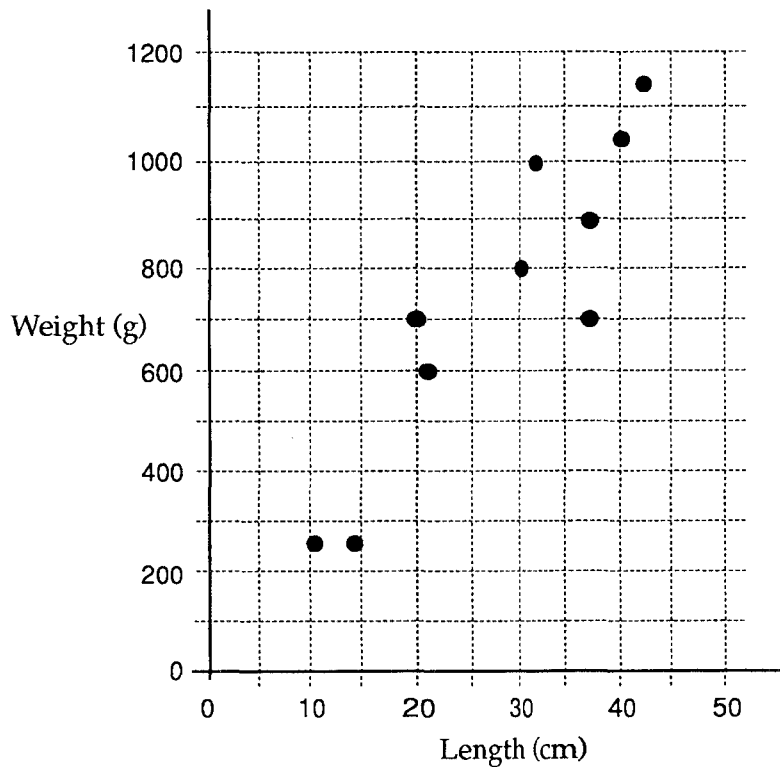
part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
(a)	2	2.4.5					2		R	Qu.21
(b)	1	2.4.5					1		R	

- ¹ any 6 points correctly plotted
- ² remaining 2 points correctly plotted
- ³ positive **linear** relationship between heights and weights



A research team visits a remote island. As part of a conservation exercise the weight and length of each of ten birds of one particular species are taken.

The results are shown on the scattergraph below.



- (a) What does the scattergraph tell you about the relationship between the heights and weights of these birds? (1)
- (b) Draw a best fitting straight line on the scattergraph. (2)
- (c) Another bird of the same species has length 26 cm. Use your line to estimate the weight of this bird. (2)
(Show clearly on the diagram how you arrive at your answer).

part	marks	Content ref.	non-calc		calc		calc neut		R/NR	Source
			C	A/B	C	A/B	C	A/B		
(a)	1	2.4.5					1		R	Qu.22
(b)	2	2.4.6					1	1	R	
(c)	2	2.4.6					2		R	

- ¹ positive **linear** relationship between heights and weights
- ² drawing line
- ³ a line directed at the origin
- ⁴ moving vertically from 26 cm
- ⁵ moving left horizontally after meeting line ≈ 680 g

