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ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Secondary Education

Mathematics 4302
Specification B
2008

SPECIMEN ASSESSMENT MATERIALS

Further copies of this booklet are available to download from the AQA Website: www.aqa.org.uk

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Contents

Background Information

Module 1

Module 3

Module 5 Paper 1

Module 5 Paper 2

Introduction

The GCSE awarding bodies have prepared revised specifications to incorporate the range of features required by GCSE and subject criteria. The specimen assessment materials accompanying the specifications is provided to give centres a reasonable idea of the general shape and character of the planned question papers in advance of the first operational examination.

Papers

These specimen questions papers have been designed to exemplify the question papers to be set for Specification B, for first qualification in June 2008. The associated mark scheme follows each paper.

The question papers are targeted at two tiers A* - D (Higher) and C - G (Foundation).

It should be noted that on both tiers candidates must not use a calculator for Section B of Modules 1 and 3 and Paper 1 of Module 5.

The question papers should be read in conjunction with AQA Specification B for 2008. The specification is available on the website www.aqa.org.uk

The question papers are intended to represent the length and balance of the papers that will be set for the examination and to indicate the types of questions that will be used. It must be emphasised, however, that the questions have not been subjected to the rigorous review that would take place with questions before use in examination.

If this document is printed from AQA's website, there is a possibility that it may not print in its original format. This will affect any questions where candidates are required to measure accurately.

Mark Schemes

Principal Examiners have prepared these mark schemes for **specimen** papers. These mark schemes have not, therefore, been through the normal process of standardising that would take place for live papers.

Glossary for Mark Schemes

GCSE examinations are marked in such a way as to award positive achievement wherever possible. Thus, for GCSE Mathematics Specification A, Papers 1 and 2, marks are awarded under various categories.

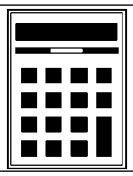
M	Method marks are awarded for a correct method which could lead to a correct answer.
A	Accuracy marks are awarded when following on from a correct method. It is not necessary to always see the method. This can be implied.
B	Marks awarded independent of method.
M dep	A method mark dependent on a previous method mark being awarded.
ft	Follow through marks. Marks awarded following a mistake in an earlier step.
SC	Special case. Marks awarded within the scheme for a common misinterpretation which has some mathematical worth.
oe	Or equivalent. Accept answers that are equivalent. eg accept 0.5 as well as $\frac{1}{2}$

General Certificate of Secondary Education

MATHEMATICS (MODULAR) (SPECIFICATION B) 43001/FA
Module 1 Foundation Tier Section A

F

Specimen Paper (Two-Tier Specification) 2008

For this paper you must have:	
• a calculator • mathematical instruments • a treasury tag.	

Time allowed for Section A: 25 minutes

For Examiner's Use			
Section A		**Section B**	
Question	Mark	Question	Mark
1		6	
2		7	
3		8	
4		9	
5		10	
Total Section A			
Total Section B			
TOTAL			
Examiner's Initials			

Instructions

- Use blue or black ink or ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- Answer the questions in the spaces provided.
- Use a calculator where appropriate.
- Do all rough work in this book.
- This paper is divided into two sections: Section A and Section B.
- After the 25 minutes allowed for Section A, you must put your calculator on the floor under your seat. You will then be given Section B.
- When you have answered Section B you may work again on Section A but you may **not** use your calculator. It must remain on the floor under your seat.
- At the end of the examination tag Section A and Section B together with Section A on top.

Information

- The maximum mark for Section A is 20.
- The marks for questions are shown in brackets.
- You may ask for more answer paper and graph paper. These must be tagged securely to this answer book.

Advice

- In all calculations, show clearly how you work out your answer.

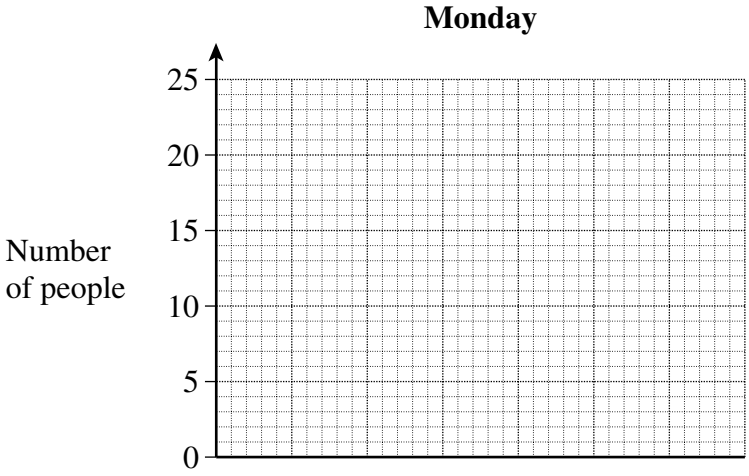
LEAVE MARGIN BLANK

Answer **all** questions in the spaces provided.

1 Adele counted the number of men, women and children in the library at midday one Monday. The table shows her results.

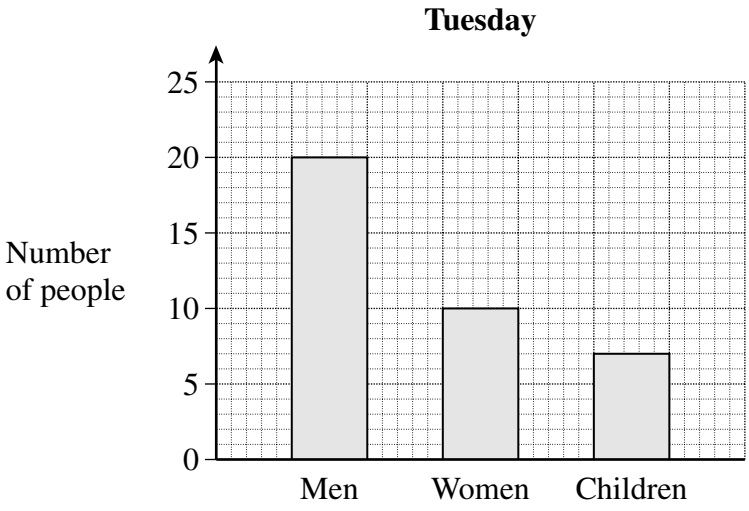
	Number of people
Men	11
Women	18
Children	6

(a) Draw a bar chart to show her results.



(2 marks)

(b) On the next day, Tuesday, Adele repeated her count.
The bar chart below shows the results for Tuesday.



Calculate the total number of people in the library on Tuesday.

.....

Answer ..... *(2 marks)*

LEAVE MARGIN BLANK

(c) How many more men were in the library on Tuesday than on Monday?

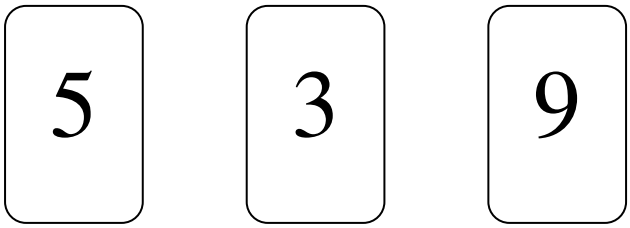
.....

.....

Answer ..... *(2 marks)*

6

2 Alia has a pack of numbered cards.
Each card is numbered with a single digit 0, 1, 2, 3, 4, 5, 6, 7, 8 or 9.
Alia selects the following three cards from the pack.



(a) Alia says the numbers on her cards have a median of 5 and a range of 6.

Explain why Alia is correct.

.....

.....

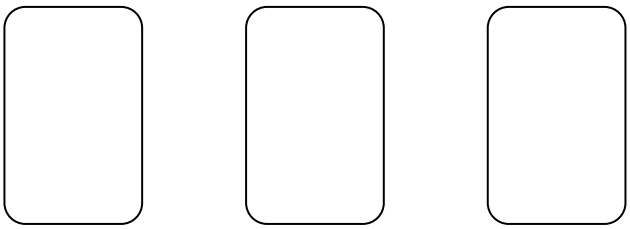
.....

(2 marks)

(b) Write one number onto each of the three cards below so that the median is 4 and the range is 7.

.....

.....



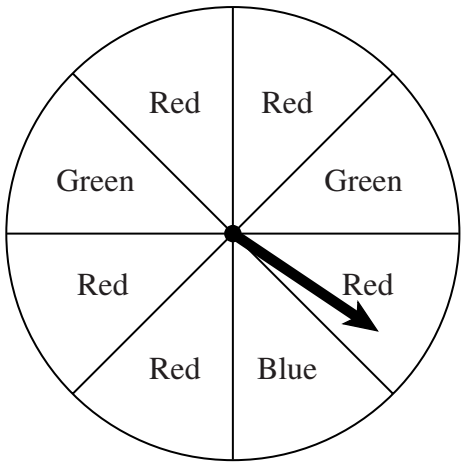
(2 marks)

4

Turn over ►

LEAVE MARGIN BLANK

3 A fair spinner has eight equal sections.
Five of the sections are red, two are green and one is blue.



(a) The arrow is spun.

(i) What is the probability of the arrow landing on blue?

.....

Answer ..... *(1 mark)*

(ii) What is the probability of the arrow landing on red?

.....

Answer ..... *(1 mark)*

(b) The arrow is spun 80 times.

How many times would you expect the arrow to land on green?

.....

.....

Answer ..... *(2 marks)*

4

4 A club sells raffle tickets for £1 each.
The winning prize is £100.

20 people bought 1 ticket each.

80 people bought 2 tickets each.

40 people bought 3 tickets each.

50 people bought 4 tickets each.

(a) Calculate the number of tickets that were sold altogether.

.....

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.....

Answer ..... *(2 marks)*

(b) Calculate the mean profit made per ticket on this raffle.

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.....

.....

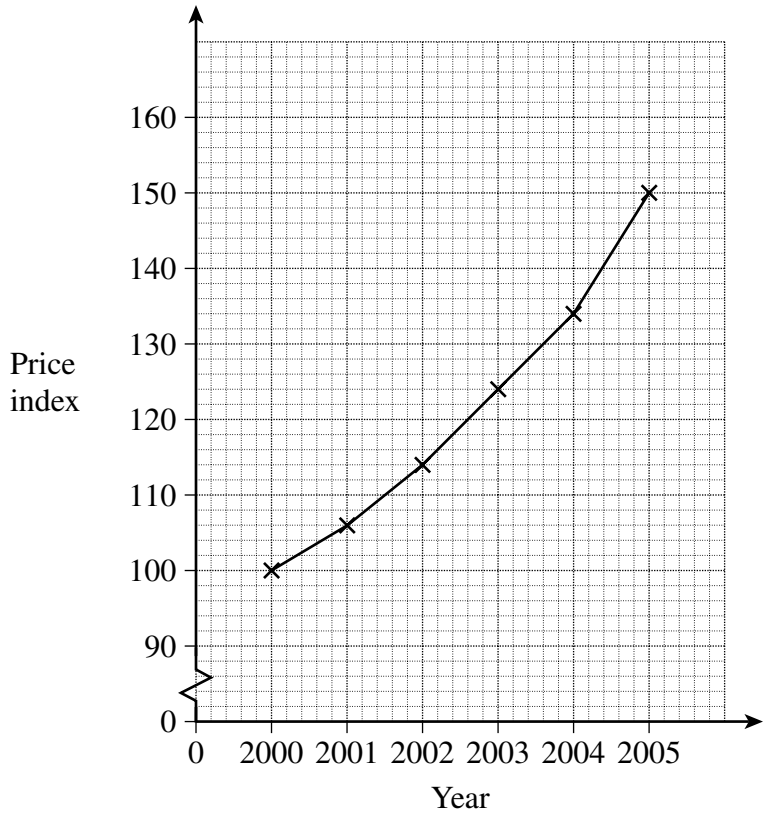
.....

Answer £ ..... *(2 marks)*

4

Turn over ▶

5 The graph shows the price index of a litre of petrol from the year 2000 to the year 2005.



In the year 2000 the price of a litre of petrol was 60p.

Tick the correct box for each of the following statements.

	True	**False**
The price of a litre of petrol was 150p in 2005		
The price of a litre of petrol increased by 50% from 2000 to 2005		
The price of a litre of petrol was 90p in 2005		

.....

.....

.....

(2 marks)

END OF SECTION A

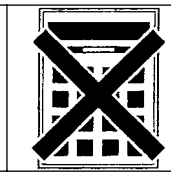
2

General Certificate of Secondary Education

MATHEMATICS (MODULAR) (SPECIFICATION B) 43001/FB
Module 1 Foundation Tier Section B

F

Specimen Paper (Two-Tier Specification) 2008

For this paper you must have: • mathematical instruments. You must **not** use a calculator.	

Time allowed for Section B: 25 minutes

Instructions

- Use blue or black ink or ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- Answer the questions in the spaces provided.
- Do all rough work in this book.
- You may **not** use your calculator in Section B. Your calculator must remain on the floor under your seat.
- When you have answered Section B you may work again on Section A but you may **not** use your calculator. It must remain on the floor under your seat.
- At the end of the examination tag Section A and Section B together with Section A on top.

Information

- The maximum mark for Section B is 20.
- The marks for questions are shown in brackets.
- You may ask for more answer paper and graph paper. These must be tagged securely to this answer book.

Advice

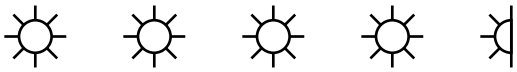
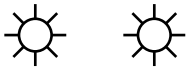
- In all calculations, show clearly how you work out your answer.

LEAVE MARGIN BLANK

Answer **all** questions in the spaces provided.

6 Shaun records the number of hours of sunshine each day for a week.
Some of his results are shown.

 = 2 hours of sunshine

Monday	
Tuesday	
Wednesday	
Thursday	
Friday	
Saturday	
Sunday	

(a) How many hours of sunshine were there on Thursday?

.....

Answer ..... hours *(1 mark)*

(b) How many more hours of sunshine were there on Monday than on Tuesday?

.....

Answer ..... hours *(2 marks)*

(c) On Sunday Shaun recorded 3 hours of sunshine.

Complete the pictogram.

(2 marks)

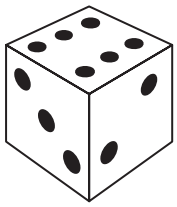
(d) Write down the modal number of hours of sunshine for these seven days.

Answer ..... hours *(1 mark)*

6

LEAVE MARGIN BLANK

7 A fair six-sided dice is thrown once.



Mark the probability of each of the following events onto the probability scale.

A: The dice lands on the number 3.

B: The dice lands on an odd number.

C: The dice lands on a number greater than 2.

(3 marks)

3

Turn over for the next question

LEAVE MARGIN BLANK

8 The table shows the number of fish caught by each of three anglers.

	Number of fish caught
Aide	16
Ben	13
Claire	7

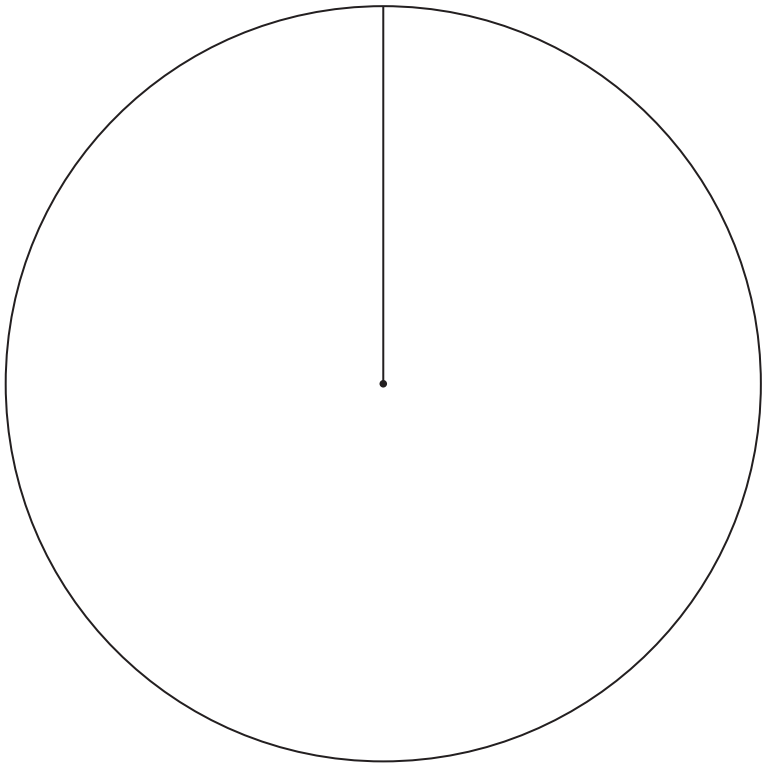
Draw and label a pie chart to show this data.

.....

.....

.....

Number of fish caught



(4 marks)

4

LEAVE MARGIN BLANK

9 Karin is collecting data about the number of brothers and the number of sisters of the people in her class.
Karin's results are given in the two-way table.

Number of brothers

Number of sisters	**0**	**1**	**2**	**3**
0	6	7	1	2
1	4	3	0	1
2	1	2	1	0
3	1	1	0	0

(a) How many people have one brother?

.....

Answer ..... *(2 marks)*

(b) How many people have more brothers than sisters?

.....

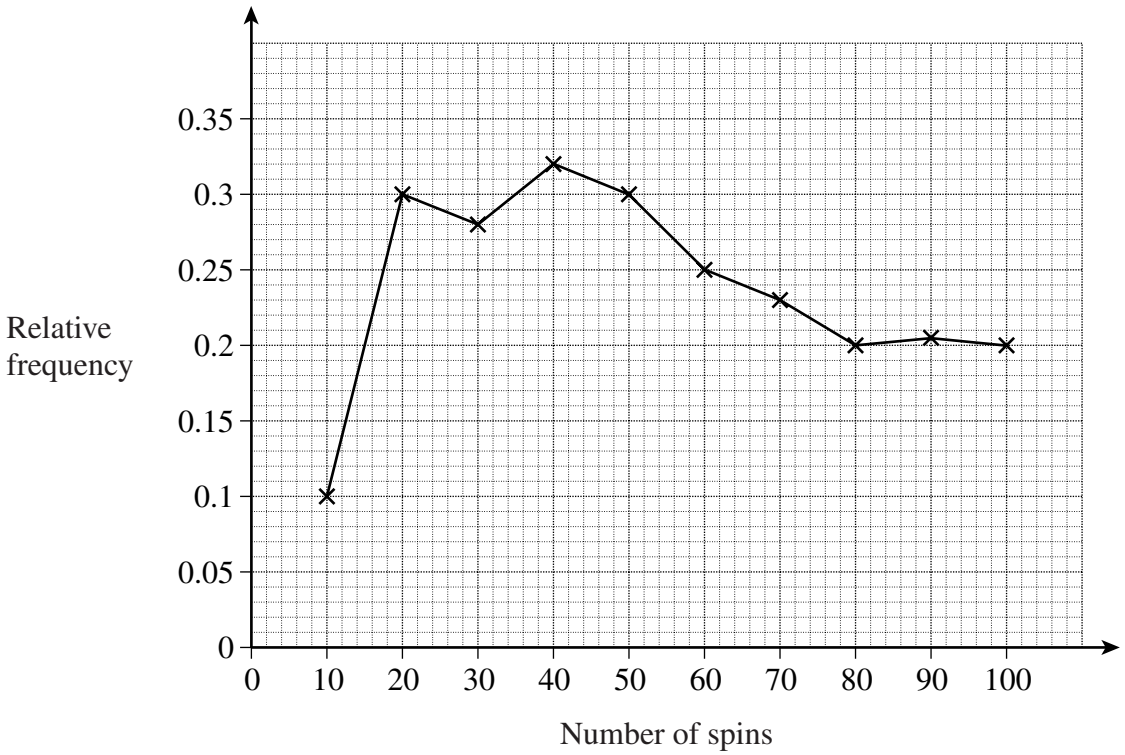
.....

Answer ..... *(2 marks)*

4

Turn over for the next question

10 Lynne has a spinner with coloured sections of equal size.
She wants to know the probability that her spinner lands on blue.
She spins it 100 times and calculates the relative frequency of blue after every 10 spins.
Her results are shown on the graph.



(a) Use the graph to calculate the number of times the spinner landed on blue in the first 20 spins.

.....

.....

Answer ..... *(2 marks)*

(b) Use the graph to estimate the probability that the spinner will land on blue.

.....

Answer ..... *(1 mark)*

3

END OF QUESTIONS

SPECIMEN MARK SCHEME 2008

Module 1 Foundation Tier

Q	Answers	Mark	Comments
	Probability - Accept fraction, decimal or percentage. Do not accept ratio. "1 out of 3" or "1 in 3" penalise once on whole paper.		
1a	3 bars correctly labelled	B1	
	Exactly 3 bars of correct heights	B1	
1b	20 + 10 + 7	M1	Adding their 3 heights condone misreads
	37	A1	
1c	20 – 11	M1	
	9	A1	
2a	Valid explanation for median	B1	eg 5 is the middle number
	Valid explanation for range	B1	eg 9 – 3 = 6
2b	All 3 cards each labelled with a number to give Median = 4	B1	eg 1, 4, 8
	Range = 7	B1	eg 2, 4, 9
3ai	$\frac{1}{8}$	B1	oe 0.125
3aii	$\frac{5}{8}$	B1	oe 0.625, 62.5%
3b	$80 \times \frac{2}{8}$	M1	
	20	A1	
4a	*fx*	M1	eg 1×20 seen (not 20 alone) or 2×80 or 160 etc
	500	A1	
4b	Their 400 /500	M1	
	£0.80 or 80p	A1	
5	False True True	B2	B1 any two correct
6a	5	B1	
6b	9 – 6	M1	$1\frac{1}{2} \times 2$
	3	A1	
6c	1 full sun	B1	
	and 1 half sun	B1	
6d	6	B1	

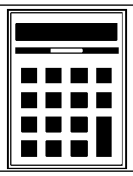
Q	Answers	Mark	Comments
7	A at $\frac{1}{6}$	B1	±2 mm
	B at $\frac{1}{2}$	B1	±2 mm
	C at $\frac{4}{6}$	B1	±2 mm
8	Any correct method seen or implied eg $\frac{16}{36} \times 360$ or 160°	M1	
	All 3 angles seen 160°, 130°, 70°	A1	
	Sectors drawn accurately	B1	±2°
	Correct labels according to size	B1	
9a	7 + 3 + 2 + 1	M1	
	13	A1	
9b	7 + 1 + 2 + 0 + 1 + 0	M1	Condone zeros not written
	11	A1	
10a	20×0.3	M1	
	6	A1	
10b	0.2	B1	

General Certificate of Secondary Education

MATHEMATICS (MODULAR) (SPECIFICATION B) 43001/HA
Module 1 Higher Tier Section A

H

Specimen Paper (Two-Tier Specification) 2008

For this paper you must have:	
• a calculator • mathematical instruments • a treasury tag.	

Time allowed for Section A: 25 minutes

Instructions

- Use blue or black ink or ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
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- Answer the questions in the spaces provided.
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- When you have answered Section B you may work again on Section A but you may **not** use your calculator. It must remain on the floor under your seat.
- At the end of the examination tag Section A and Section B together with Section A on top.

Information

- The maximum mark for Section A is 20.
- The marks for questions are shown in brackets.
- You may ask for more answer paper and graph paper. These must be tagged securely to this answer book.

Advice

- In all calculations, show clearly how you work out your answer.

For Examiner's Use			
Section A		**Section B**	
Question	Mark	Question	Mark
1		6	
2		7	
3		8	
4		9	
		10	
Total Section A			
Total Section B			
TOTAL			
Examiner's Initials			

LEAVE MARGIN BLANK

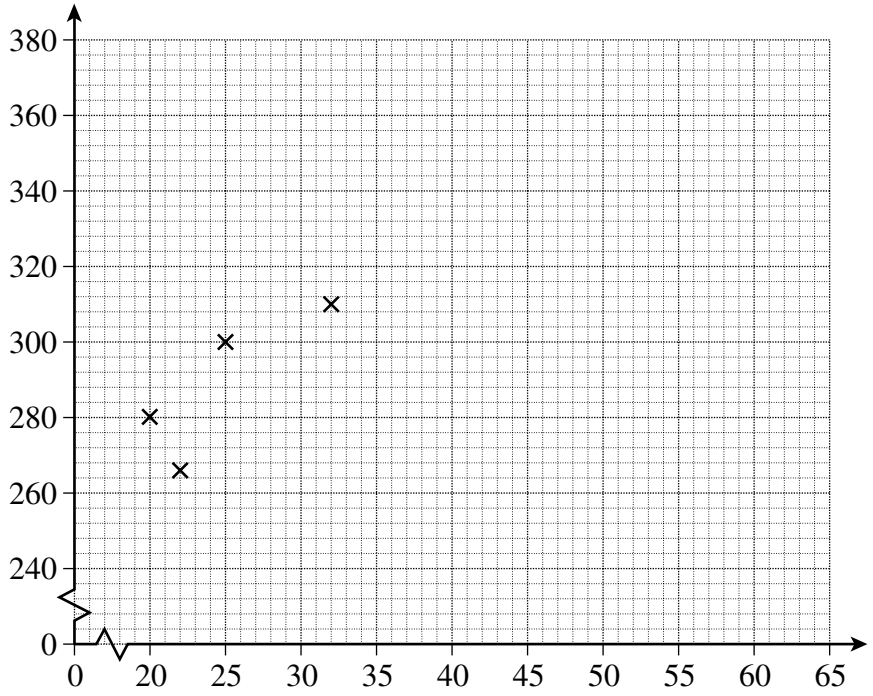
Answer **all** questions in the spaces provided.

1 Ten workmates run in a marathon.
The table shows their age in years and their time in minutes.

Age (years)	20	22	25	32	35	43	45	52	55	60
Time (minutes)	280	265	300	310	295	320	335	325	355	340

(a) The data for the youngest four workmates has been plotted on the scatter graph below.

Plot the data for the remaining workmates. *(2 marks)*



(b) Draw a line of best fit on the scatter graph. *(1 mark)*

(c) Describe the relationship between the age and the time for the workmates.

.....

.....

(1 mark)

4

2 (a) A road safety officer records the speed of 50 cars outside a school.

Speed, s (mph)	Frequency	Midpoint
$20 \leqslant s < 25$	12	22.5
$25 \leqslant s < 30$	27	
$30 \leqslant s < 35$	8	
$35 \leqslant s < 40$	3	

Use the class midpoints to calculate an estimate of the mean speed of these 50 cars.

.....

.....

.....

Answer ..... mph *(3 marks)*

(b) The table shows the number of accidents outside the school in the last six years.

Year	2000	2001	2002	2003	2004	2005
Number of accidents	4	5	9	10	9	11

The first 3-point moving average is 6.

Calculate the second and third 3-point moving averages.

.....

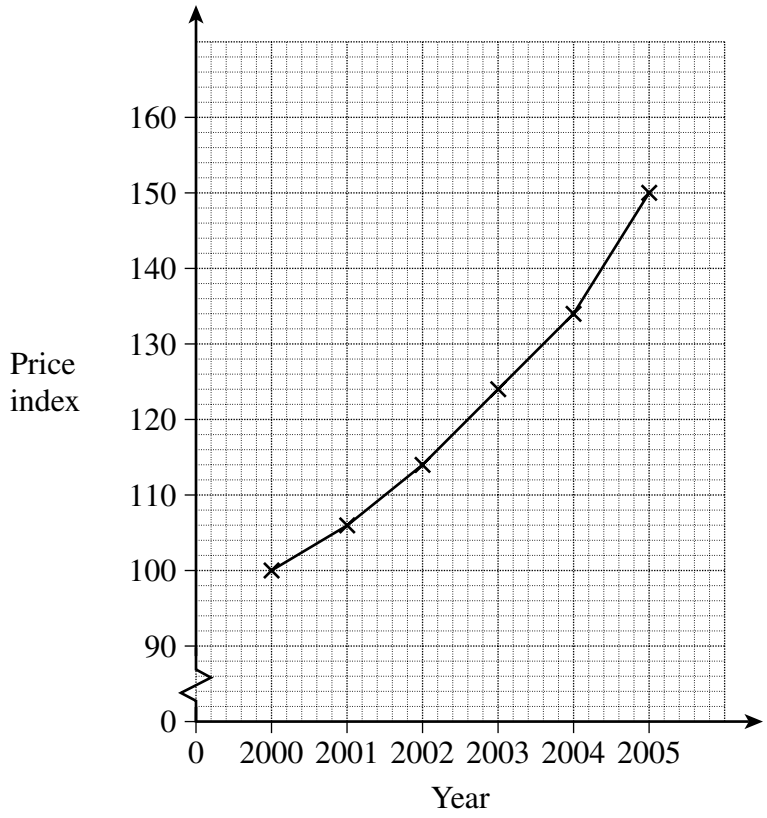
.....

.....

Answer ..... and ..... *(3 marks)*

6

3 (a) The graph shows the price index of a litre of petrol from the year 2000 to the year 2005.



In the year 2000 the price of a litre of petrol was 60p.

Tick the correct box for each of the following statements.

	True	**False**
The price of a litre of petrol was 150p in 2005		
The price of a litre of petrol increased by 50% from 2000 to 2005		
The price of a litre of petrol was 90p in 2005		

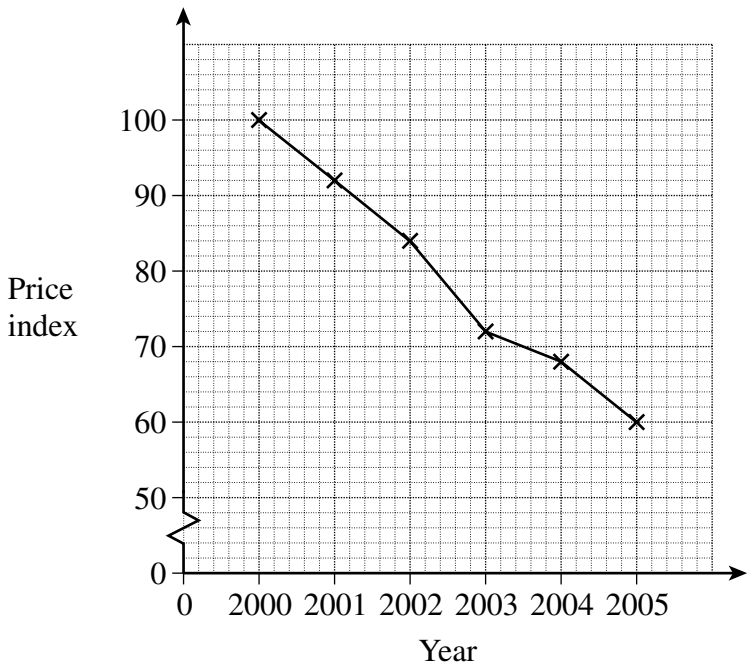
.....

.....

.....

(2 marks)

(b) The graph shows the price index of a DVD player from the year 2000 to the year 2005.



In the year 2000 the price of the DVD player was £300.

Tick the correct box for each of the following statements.

	True	**False**
The price of the DVD player went down by the same amount each year		
The DVD player cost £260 in the year 2005		
The DVD player cost 60% of the 2000 cost in the year 2005		

(2 marks)

4

LEAVE MARGIN BLANK

4 Sam and Tom both own a dog.

The probability that Sam walks his dog on a given day is 0.7
The probability that Tom walks his dog on a given day is x.
These are independent events.

(a) (i) Write down an expression for the probability that Tom does **not** walk his dog on a given day.

Answer ..... *(1 mark)*

(ii) Show that the probability that neither of them walks their dog on a given day is $0.3 - 0.3x$

.....

.....

.....

(2 marks)

(b) You are given that $x = 0.6$

Find the probability that at least one of them walks their dog on three consecutive days.

.....

.....

.....

.....

Answer ..... *(3 marks)*

6

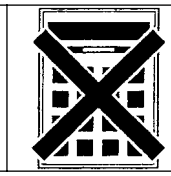
END OF SECTION A

General Certificate of Secondary Education

MATHEMATICS (MODULAR) (SPECIFICATION B) 43001/HB
Module 1 Higher Tier Section B

H

Specimen Paper (Two-Tier Specification) 2008

For this paper you must have: • mathematical instruments. You must **not** use a calculator.	

Time allowed for Section B: 25 minutes

Instructions

- Use blue or black ink or ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- Answer the questions in the spaces provided.
- Do all rough work in this book.
- You may **not** use your calculator in Section B. Your calculator must remain on the floor under your seat.
- When you have answered Section B you may work again on Section A but you may **not** use your calculator. It must remain on the floor under your seat.
- At the end of the examination tag Section A and Section B together with Section A on top.

Information

- The maximum mark for Section B is 20.
- The marks for questions are shown in brackets.
- You may ask for more answer paper and graph paper. These must be tagged securely to this answer book.

Advice

- In all calculations, show clearly how you work out your answer.

LEAVE MARGIN BLANK

Answer **all** questions in the spaces provided.

5 Karin is collecting data about the number of brothers and the number of sisters of the people in her class.
Karin's results are given in the two-way table.

Number of brothers

Number of sisters	**0**	**1**	**2**	**3**
0	6	7	1	2
1	4	3	0	1
2	1	2	1	0
3	1	1	0	0

(a) How many people have one brother?

.....

Answer ..... *(2 marks)*

(b) How many people have more brothers than sisters?

.....

.....

Answer ..... *(2 marks)*

(c) There are 30 people in Karin's class.

What is the probability that a randomly chosen person from her class has the same number of brothers and sisters?

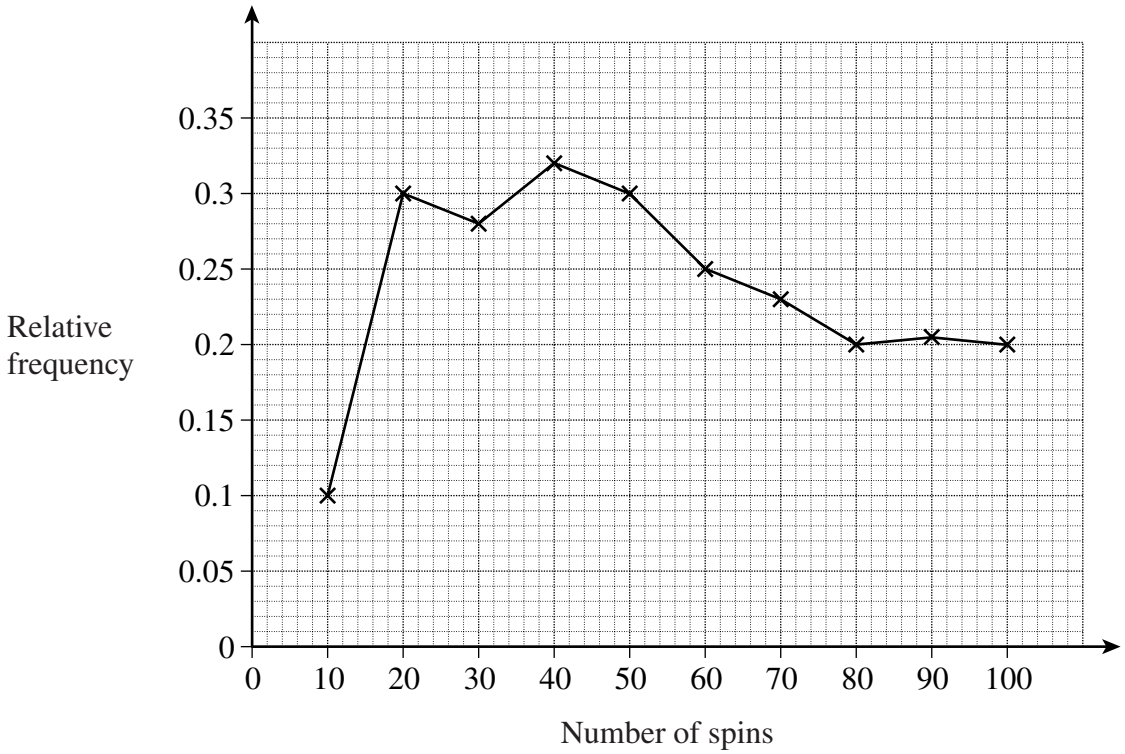
.....

.....

Answer ..... *(2 marks)*

6

6 Lynne has a spinner with coloured sections of equal size.
She wants to know the probability that her spinner lands on blue.
She spins it 100 times and calculates the relative frequency of blue after every 10 spins.
Her results are shown on the graph.



(a) Use the graph to calculate the number of times the spinner landed on blue in the first 20 spins.

.....

.....

Answer ..... *(2 marks)*

(b) Use the graph to estimate the probability that the spinner will land on blue.

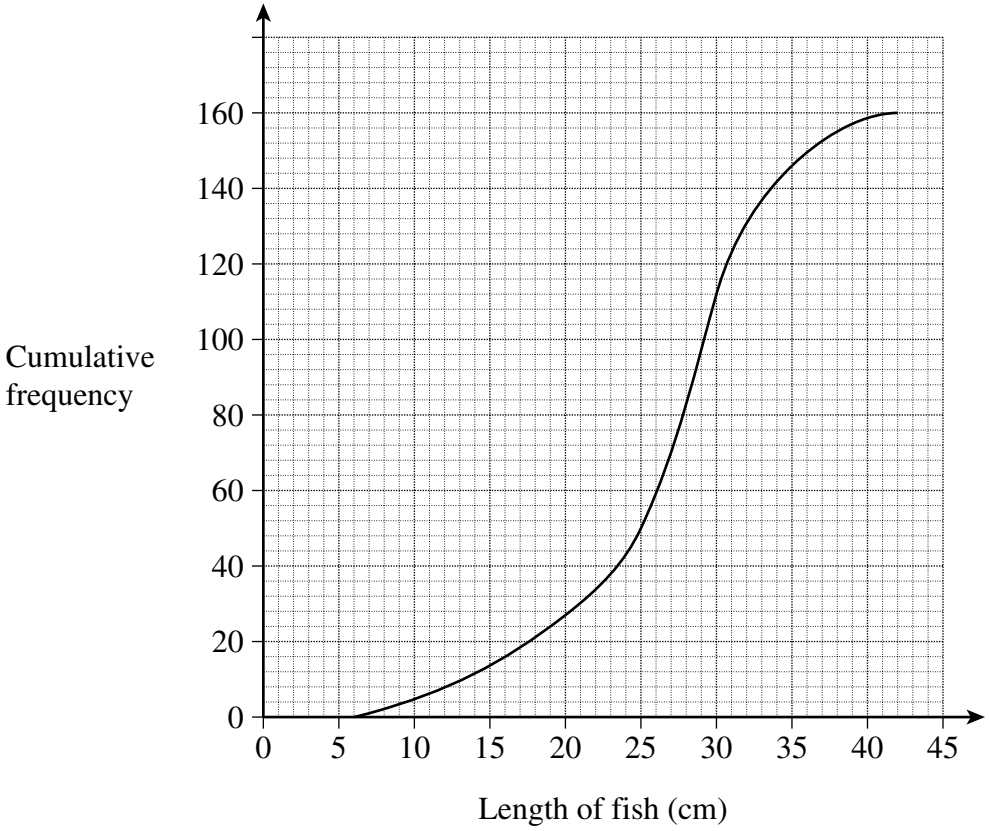
.....

Answer ..... *(1 mark)*

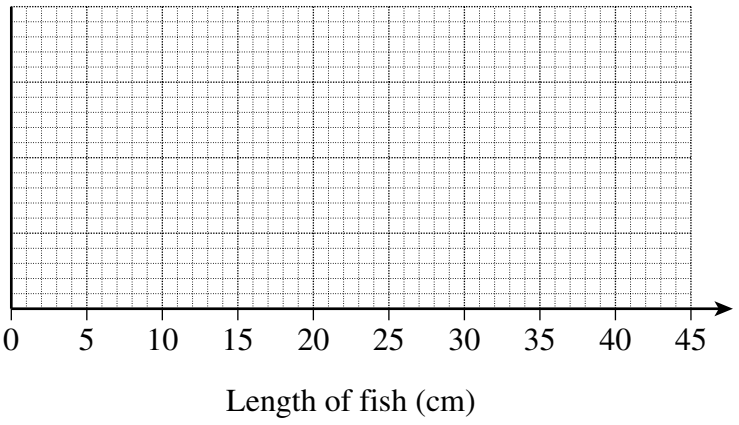
3

LEAVE MARGIN BLANK

7 The cumulative frequency diagram shows the lengths of 160 fish caught in a river one summer.
The shortest fish was 7 cm.
The longest fish was 42 cm.



Use the graph and the information given to draw a box plot of the length of these fish.



(3 marks)

3

LEAVE MARGIN BLANK

8 (a) What is a National Census?

.....

.....

.....

(1 mark)

(b) According to a National Census, 23% of people are under 21 and 34% of people are over 60.
Sally wants to give a questionnaire to a sample of 150 people stratified by age.

Use the National Census figures to obtain a stratified sample of size 150.

.....

.....

.....

Answer Under 21 .....

21 – 60 .....

Over 60 .....

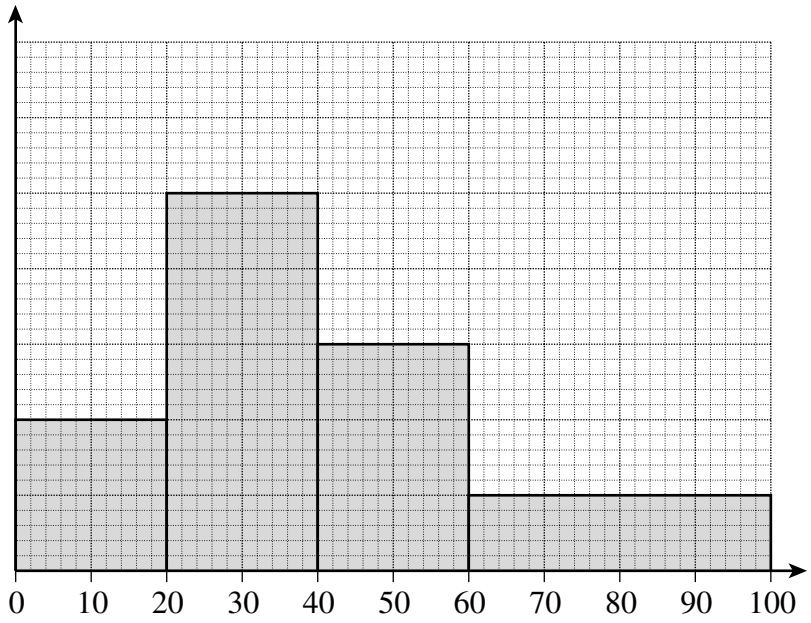
(3 marks)

4

Turn over for the next question

LEAVE MARGIN BLANK

9 The histogram shows the age distribution of a town.



There are 160 people under 20 years old in this town.

Estimate the probability that a person chosen at random from this town is over 55 years old and under 75 years old?

.....

.....

.....

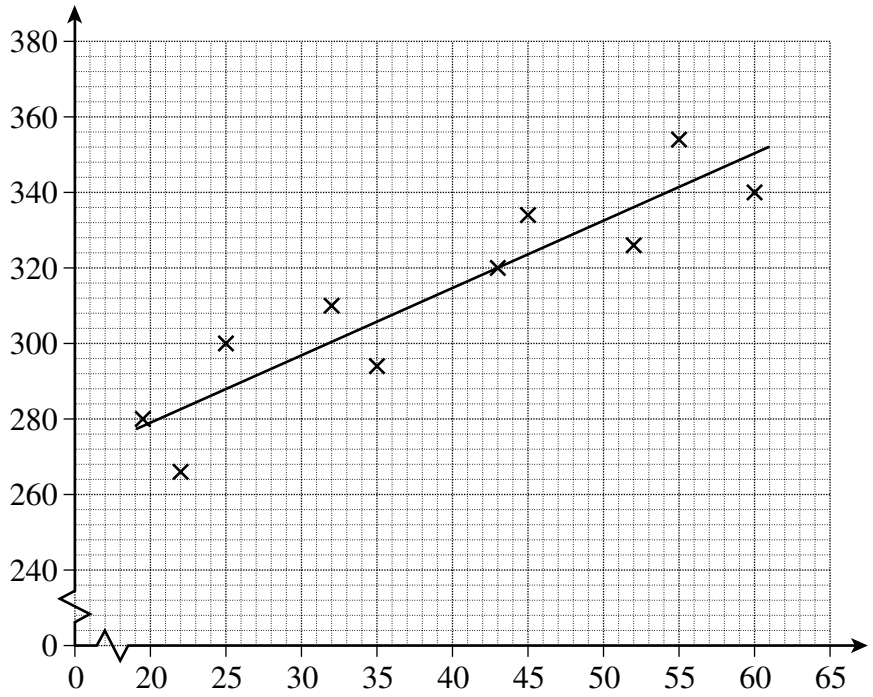
.....

Answer ..... *(4 marks)*

4

END OF QUESTIONS

Q	Answers	Mark	Comments
1a	see below	B2	–1 each error or omission
1b	see below	B1	must pass through gate of (20, 272) and (20, 284) and gate of (60, 344) and (60, 356)
1c	older runners tend to take longer to finish	B1	oe



2a	Midpoints correct (see below)	B1	
	Σfx attempted and ÷ 50	M1	
	27.7	A1	
2b	(5+9+10) / 3	M1	
	= 8	A1	
	(9+10+9) / 3 = 9.3…	A1	

Speed (mph)	Frequency	Midpoint	fx
20 to less than 25	12	22.5	270
25 to less than 30	27	27.5	742.5
30 to less than 35	8	32.5	260
35 to less than 40	3	37.5	112.5
	$\Sigma f = 50$		$\Sigma fx = 1385$

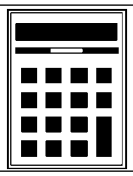
Q	Answers	Mark	Comments
3a	False, True, True	B2	B1 two correct
3b	False, False, True	B2	B1 two correct
4ai	$(1 - x)$	B1	
4aii	$(1 - 0.7) \times (1 - x)$	M1	for multiplying correct brackets
	$= 0.3\ (1 - x)$		
	$= 0.3 - 0.3x$	A1	convincing
4b	sight of 0.12 or 0.88	B1	
	$(0.88)^3$	M1	
	0.681472	A1	0.68 or better
5a	7 + 3 + 2 + 1	M1	
	= 13	A1	
5b	7 + 1 + 2 + 0 + 1 + 0	M1	condone zeros not written
	= 11	A1	
5c	$\frac{10}{30}$	B1 B1	oe
6a	20×0.3	M1	
	= 6	A1	
6b	0.2	B1	
7	median line at 27-28	B1	
	LQ at 23 – 24 UQ at 30 – 31	B1	
	whiskers to 7 and 42 and a ‘box’	B1	
8a	A questionnaire given to every home/ person in a country	B1	
8b	51 people over 60	B1	
	34.5 people under 21 and 64.5 people 21 – 60	M1	
	34 under 21 and 65 21 – 60	A1	or 35 under 21 and 64 21 – 60
9	another age group correct	B1	400 in 20 – 40 240 in 40 – 60 160 in 60 – 100
	finds total in town to be 960	M1	
	240/4 + 3(160)/8	M1	oe
	120 / 960	A1	1/8

General Certificate of Secondary Education

MATHEMATICS (MODULAR) (SPECIFICATION B) 43003/FA
Module 3 Foundation Tier Section A

F

Specimen Paper (Two-Tier Specification) 2008

For this paper you must have:	
• a calculator • mathematical instruments • a treasury tag.	

Time allowed for Section A: 40 minutes

For Examiner's Use			
Section A		**Section B**	
Pages	Mark	Pages	Mark
2–3		2–3	
4–5		4–5	
6		6	
Total Section A			
Total Section B			
TOTAL			
Examiner's Initials			

Instructions

- Use blue or black ink or ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- Answer the questions in the spaces provided.
- Use a calculator where appropriate.
- Do all rough work in this book.
- This paper is divided into two sections: Section A and Section B.
- After the 40 minutes allowed for Section A, you must put your calculator on the floor under your seat. You will then be given Section B.
- When you have answered Section B you may work again on Section A but you may **not** use your calculator. It must remain on the floor under your seat.
- At the end of the examination tag Section A and Section B together with Section A on top.

Information

- The maximum mark for Section A is 32.
- The marks for questions are shown in brackets.
- You may ask for more answer paper. This must be tagged securely to this answer book.

Advice

- In all calculations, show clearly how you work out your answer.

Answer **all** questions in the spaces provided.

1 Jason buys some items for college.
He buys 4 black pens at £1.05 each
3 notebooks at £1.42 each
5 pencils at 38p each.

Complete the bill below.

	£	p
4 black pens at £1.05		
3 notebooks at £1.42		
5 pencils at 38p		
Total		

.....

.....

(4 marks)

2 Kevin is making four-digit numbers.
Each number contains all the digits 3, 6, 2 and 7.

(a) Write down the largest four-digit number Kevin can make.

.....

.....

Answer ..... *(1 mark)*

(b) Write down the smallest four-digit even number Kevin can make.

.....

.....

Answer ..... *(2 marks)*

LEAVE MARGIN BLANK

3 (a) Vikki earns £5.30 an hour working at a cinema.
Each week she works 5 days.
Each day she works 8 hours.

How much does Vikki earn each week?

.....

.....

.....

.....

Answer £ ..... *(3 marks)*

(b) 700 people attend the cinema one evening.

(i) Of the 700 people, 65% are adults.

How many of the people are adults?

.....

.....

.....

Answer ..... *(2 marks)*

(ii) Of the 700 people, $\frac{3}{5}$ are female.

How many of the people are female?

.....

.....

.....

Answer ..... *(2 marks)*

14

Turn over ►

4 Petrol costs 88p per litre.

Calculate the price of 1 gallon of petrol.
Use the conversion 1 gallon = 4.5 litres.

.....

.....

.....

Answer £ ..... *(2 marks)*

5 (a) Which is larger, 4^3 or 3^4?
You **must** show your working.

.....

.....

.....

Answer ..... *(2 marks)*

(b) Place the following numbers in order of size, starting with the smallest.

$2\frac{3}{5}$ 2.08 1.5^2 2.237 2.64

.....

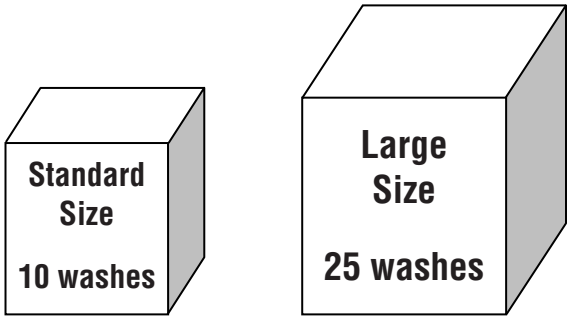
.....

.....

Answer ..... *(3 marks)*

LEAVE MARGIN BLANK

6 Boxes of washing powder are sold in two sizes.



£2.48 **£5.99**

Which size is the better value for money?
You **must** show your working.

.....

.....

.....

.....

Answer ..... *(2 marks)*

7 Bethany made 150 small cakes to sell at a coffee morning.
By 11.30 am she had sold 110 of the cakes at 15p each.
Bethany then reduced the selling price of the remaining cakes to 10p each.
She was left with 7 unsold cakes which she gave to her friends.

Find the total amount Bethany received from selling the cakes.

.....

.....

.....

.....

Answer £ ..... *(4 marks)*

13

Turn over ►

LEAVE MARGIN BLANK

8 Michael works in a toy store.
He earns £208 each week.
After a pay rise, Michael's weekly wage increases to £218.40 each week.

Calculate the percentage increase in Michael's weekly wage.

.....

.....

.....

.....

.....

Answer ..... % *(3 marks)*

9 Garry runs a distance of 15 km, correct to the nearest km.

(a) Write down the minimum distance Garry could have run

.....

Answer ..... km *(1 mark)*

(b) Write down the maximum distance Garry could have run.

.....

Answer ..... km *(1 mark)*

END OF SECTION A

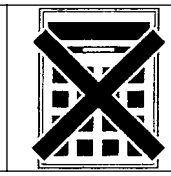
5

General Certificate of Secondary Education

MATHEMATICS (MODULAR) (SPECIFICATION B) 43003/FB
Module 3 Foundation Tier Section B

F

Specimen Paper (Two-Tier Specification) 2008

For this paper you must have: • mathematical instruments. You must **not** use a calculator.	

Time allowed for Section B: 40 minutes

Instructions

- Use blue or black ink or ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- Answer the questions in the spaces provided.
- Do all rough work in this book.
- You may **not** use your calculator in Section B. Your calculator must remain on the floor under your seat.
- When you have answered Section B you may work again on Section A but you may **not** use your calculator. It must remain on the floor under your seat.
- At the end of the examination tag Section A and Section B together with Section A on top.

Information

- The maximum mark for Section B is 32.
- The marks for questions are shown in brackets.
- You may ask for more answer paper. This must be tagged securely to this answer book.

Advice

- In all calculations, show clearly how you work out your answer.

LEAVE MARGIN BLANK

Answer **all** questions in the spaces provided.

10 (a) (i) Write 3865 in words.

Answer .....

.....

(1 mark)

(ii) Write 3865 to the nearest 100.

Answer ..... *(1 mark)*

(b) From the list of numbers

6 8 11 21 25 29 34

write down

(i) two numbers with a sum of 31

.....

.....

Answer ..... and ..... *(1 mark)*

(ii) two numbers with a difference of 26

.....

.....

Answer ..... and ..... *(1 mark)*

(iii) a multiple of 7

Answer ..... *(1 mark)*

(iv) a factor of 24

Answer ..... *(1 mark)*

(v) a square number

Answer ..... *(1 mark)*

LEAVE MARGIN BLANK

11 Ali buys a number of boxes of chocolates.
Each box of chocolates costs £4.29

How many boxes of chocolates can Ali buy for £20?

.....

.....

.....

Answer ..... *(2 marks)*

12 The table shows the highest and lowest temperatures recorded in five cities.

	Birmingham	**Edinburgh**	**London**	**Manchester**	**Newcastle**
Highest temperature	27 °C	25 °C	31 °C	29 °C	26 °C
Lowest temperature	–2 °C	–7 °C	1 °C	–2 °C	–5 °C

(a) Which city recorded the biggest difference between its highest and lowest temperatures?

.....

.....

Answer ..... *(1 mark)*

(b) The difference between the highest and lowest temperatures is the same for two cities.

Write down the names of these two cities.

.....

.....

.....

Answer ..... and ..... *(1 mark)*

11

13 (a) Work out 483×52

.....

.....

.....

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.....

.....

Answer ..... *(3 marks)*

(b) (i) Write 86.3624 to 1 decimal place.

Answer ..... *(1 mark)*

(ii) Write 86.3624 to 3 decimal places.

Answer ..... *(1 mark)*

(c) Write 378 to 1 significant figure.

Answer ..... *(1 mark)*

14 (a) Work out $4.6 - 2.38$

.....

.....

.....

Answer ..... *(1 mark)*

(b) Work out $\frac{2}{5} \times \frac{3}{4}$

Give your answer in its simplest form.

.....

.....

Answer ..... *(2 marks)*

LEAVE MARGIN BLANK

15 50 people were asked how they travel to work.
Some of the results are shown in the table.

Method of travel	Number of people
Car	23
Train	
Bicycle	8
Walk	5

Calculate the percentage of these people who travelled by train.

.....

.....

.....

.....

Answer ..... % *(3 marks)*

16 Kristen drives 252 miles from Redcar to London in 4 hours and 30 minutes.

Calculate her average speed in miles per hour.

.....

.....

.....

.....

Answer ..... mph *(3 marks)*

15

Turn over ►

17 Find an approximate value of $\dfrac{497 \times 6.04}{0.312}$

.....

.....

.....

.....

Answer ..... *(3 marks)*

18 Express 360 as a product of its prime factors.
Give your answer in index form.

.....

.....

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.....

.....

.....

Answer ..... *(3 marks)*

END OF QUESTIONS

6

There are no questions printed on this page

SPECIMEN MARK SCHEME 2008

Module 3 Foundation Tier

Q	Answers	Mark	Comments
1	£4.20	M1	
	£4.26	M1	
	£1.90 or 190p	M1	
	£10.36	A1	
2a	7632	B1	
2b	2376	B1	
3a	8×5 or 40	M1	5.30×8 or 42.40
	"40" $\times$ 5.30	M1	"42.40" $\times$ 5
	£212	A1	
3bi	$65 \div 100 \times 700$	M1	0.65×700
	455	A1	
3bii	$3 \div 5 \times 700$	M1	oe
	420	A1	
4	4.5×0.88 or 4.5×88	M1	
	£3.96	A1	
5a	$4^3 = 64$ or $3^4 = 81$	M1	
	3^4 is larger	A1	oe
5b	2.6 or 2.25 seen	M1	oe eg $2\frac{1}{4}$
	2.08, 2.237, 2.25, 2.6, 2.64	A2	–1 each error or omission
6	2.48×2.5 (=6.20) or $5.99 \div 2.5$(=2.396)	M1	oe eg comparing cost per wash
	Correct values for comparison and large size	A1	
7	110×15	M1	1650
	£16.50	A1	
	$(150 - 110 - 7) \times 10$	M1	Or 33×10, 330, 3.30
	19.80	A1	

Q	Answers	Mark	Comments
8	Increase of £10.40	M1	$\frac{218.40}{208}$ = 1.05 (or 105)
	$\frac{10.40}{208} \times 100$	M1	105 – 100 or 1.05 – 1
	5%	A1	
9	14.5	B1	
	15.5	B1	Accept 15.49 … or $15.4\dot{9}$
10ai	Three thousand eight hundred and sixty five	B1	
10ii	3900	B1	
10bi	6 and 25	B1	
10bii	8 and 34	B1	
10biii	21	B1	
10biv	6 or 8	B1	
10bv	25	B1	
11	20 ÷ 4.29	M1	
	4	A1	
12a	Edinburgh	B1	
12b	Manchester and Newcastle	B1	
13a	× 2 line correct (966)	M1	Accept alternative methods
	× 5 line correct (24150)	M1	
	25116	A1	
13bi	86.4	B1	
13bii	86.362	B1	
13c	400	B1	
14a	2.22	B1	
14b	$\frac{6}{20}$	M1	
	$\frac{3}{10}$	A1	0.3

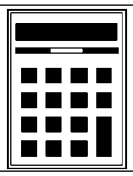
Q	Answers	Mark	Comments
15	$50 - (23 + 8 + 5)$	M1	14 seen
	Their $14 \div 50 \times 100$	M1	Their 14×2
	28	A1	
16	$252 \div$ time	M1	
	$252 \div 4.5$	M1	
	56	A1	
17	$\frac{500 \times 6}{0.3}$	M1	Any two correct
	$\frac{500 \times 6 \times 10}{3}$ or $\frac{3000}{0.3}$	M1	
	10000	A1	
18	$360 = 2\ (\times)\ 180$	M1	$3\ (\times)\ 120$ or $5\ (\times)\ 72$
	$2 \times 2 \times 2 \times 3 \times 3 \times 5$	A1	Condone missing $\times$ signs here
	$2^3 \times 3^2 \times 5$	A1	Do not accept factor of 1

General Certificate of Secondary Education

MATHEMATICS (MODULAR) (SPECIFICATION B) 43003/HA
Module 3 Higher Tier Section A

H

Specimen Paper (Two-Tier Specification) 2008

For this paper you must have:	
• a calculator • mathematical instruments • a treasury tag.	

Time allowed for Section A: 40 minutes

For Examiner's Use			
Section A		**Section B**	
Pages	Mark	Pages	Mark
2–3		2–3	
4–5		4–5	
6–7		6	
Total Section A			
Total Section B			
TOTAL			
Examiner's Initials			

Instructions

- Use blue or black ink or ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- Answer the questions in the spaces provided.
- Use a calculator where appropriate.
- Do all rough work in this book.
- This paper is divided into two sections: Section A and Section B.
- After the 40 minutes allowed for Section A, you must put your calculator on the floor under your seat. You will then be given Section B.
- When you have answered Section B you may work again on Section A but you may **not** use your calculator. It must remain on the floor under your seat.
- At the end of the examination tag Section A and Section B together with Section A on top.

Information

- The maximum mark for Section A is 32.
- The marks for questions are shown in brackets.
- You may ask for more answer paper and graph paper. These must be tagged securely to this answer book.

Advice

- In all calculations, show clearly how you work out your answer.

Answer **all** questions in the spaces provided.

1 Bethany made 150 small cakes to sell at a coffee morning.
By 11.30 am she had sold 110 of the cakes at 15p each.
Bethany then reduced the selling price of the remaining cakes to 10p each.
She was left with 7 unsold cakes which she gave to her friends.

Find the total amount Bethany received from selling the cakes.

.....

.....

.....

.....

Answer £ ..... *(4 marks)*

2 Hassan earns £26 000 per year.
The first £5000 is tax free.
He pays 22% of the remaining salary in tax.

How much tax does he pay?

.....

.....

.....

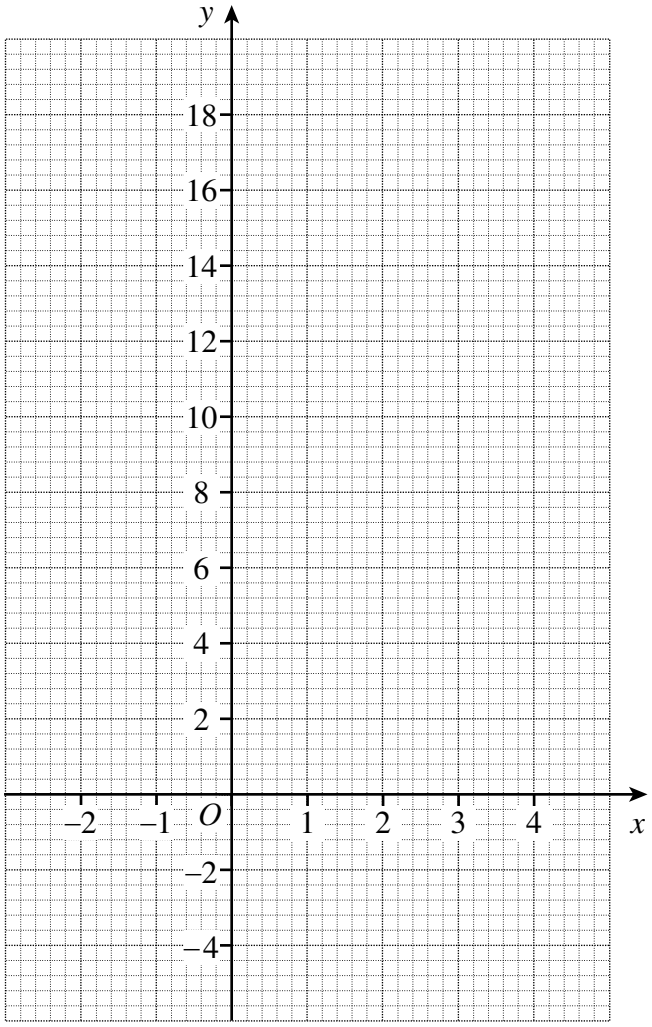
Answer £ ..... *(2 marks)*

3 (a) Complete the table of values for $y = 2x^2 - 5x$

x	–2	–1	0	1	2	3	4
y	18	7	0	–3	–2		12

(1 mark)

(b) On the grid below, draw the graph of $y = 2x^2 - 5x$ for values of x between –2 and +4.



(2 marks)

(c) Write down the value of x for which y has a minimum value.

Answer $x =$ ..... *(1 mark)*

10

4 A fruit drink is made using water and cordial.
A bottle contains 560 ml of fruit drink.
The ratio of water to cordial is 7 : 1

How much water is in the fruit drink?

.....

.....

.....

.....

Answer ..... ml *(2 marks)*

5 Nick invests £10 000 for 3 years at 4% per year compound interest.

How much interest does he earn?

.....

.....

.....

.....

.....

Answer £ ..... *(3 marks)*

6 Garry runs a distance of 15 km, correct to the nearest km.

(a) Write down the minimum distance Garry could have run

.....

Answer ..... km *(1 mark)*

(b) Write down the maximum distance Garry could have run.

.....

Answer ..... km *(1 mark)*

7 Louise sold some items on the internet for £94.50
She calculated that she made a profit of 26% on the cost price of the items.
However, when doing her calculation she forgot that she spent £3.50 on postage.

Work out her correct percentage profit.

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.....

Answer ..... % *(6 marks)*

Turn over for the next question

13

8 The force of attraction F between two magnets varies inversely as the square of the distance d between them.
When the magnets are 1.5 cm apart, the force of attraction is 28 Newtons.

(a) Find an equation connecting F and d.

.....

.....

.....

.....

Answer ..... *(3 marks)*

(b) What is the distance between the magnets when the force of attraction is 43.75 Newtons?

.....

.....

.....

.....

Answer ..... cm *(2 marks)*

LEAVE MARGIN BLANK

9 A lift cable can safely carry a total load 1200 kg.
The lift weighs 280 kg.
Both numbers are given to two significant figures.
The total load is made up of the weight of the lift and its contents.
The lift carries boxes weighing 65 kg each, correct to the nearest kg.

How many boxes can safely be carried?
You **must** show all your working.

.....

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.....

.....

.....

Answer ..... *(4 marks)*

END OF SECTION A

9

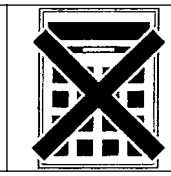
There are no questions printed on this page

General Certificate of Secondary Education

MATHEMATICS (MODULAR) (SPECIFICATION B) 43003/HB
Module 3 Higher Tier Section B

H

Specimen Paper (Two-Tier Specification) 2008

For this paper you must have: • mathematical instruments. You must **not** use a calculator.	

Time allowed for Section B: 40 minutes

Instructions

- Use blue or black ink or ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- Answer the questions in the spaces provided.
- Do all rough work in this book.
- You may **not** use your calculator in Section B. Your calculator must remain on the floor under your seat.
- When you have answered Section B you may work again on Section A but you may **not** use your calculator. It must remain on the floor under your seat.
- At the end of the examination tag Section A and Section B together with Section A on top.

Information

- The maximum mark for Section B is 32.
- The marks for questions are shown in brackets.
- You may ask for more answer paper and graph paper. This must be tagged securely to this answer book.

Advice

- In all calculations, show clearly how you work out your answer.

Answer **all** questions in the spaces provided.

10 50 people were asked how they travel to work.
Some of the results are shown in the table.

Method of travel	Number of people
Car	23
Train	
Bicycle	8
Walk	5

Calculate the percentage of these people who travelled by train.

.....

.....

.....

.....

Answer ..... % *(3 marks)*

11 Kristen drives 252 miles from Redcar to London in 4 hours and 30 minutes.

Calculate her average speed in miles per hour.

.....

.....

.....

.....

Answer ..... mph *(3 marks)*

12 Natalie writes $-5(a + 2) = -5a - 3$

Explain why Natalie is wrong.

.....

.....

.....

(1 mark)

13 Find an approximate value of $\dfrac{497 \times 6.04}{0.312}$

.....

.....

.....

.....

Answer ..... *(3 marks)*

14 Express 360 as a product of its prime factors.
Give your answer in index form.

.....

.....

.....

.....

.....

.....

Answer ..... *(3 marks)*

13

15 A jug has a capacity of $2\frac{2}{5}$ litres.

1 litre = $1\frac{3}{4}$ pints.

Work out the capacity in pints.
Give your answer as a mixed number.

.....

.....

.....

.....

.....

Answer ..... pints *(3 marks)*

16 The table shows the populations of three European countries in 2002.

Country	Population
Germany	8.3×10^7
Switzerland	7.3×10^6
Italy	5.8×10^7

Work out the difference between the smallest and largest population.

.....

.....

.....

.....

Answer ..... *(2 marks)*

17 (a) $(x - 3)^2 \equiv x^2 + px + 9$ is an identity.

What is the value of p?

.....

.....

Answer $p =$ ..... *(1 mark)*

(b) $(x - 3)^2 = 9$ is an equation.

Explain why $x = 0$ is a solution of this equation.

.....

.....

(1 mark)

18 (a) Work out $81^{\frac{1}{2}} \times 2^{-3}$

Give your answer as a mixed number.

.....

.....

.....

Answer ..... *(3 marks)*

(b) Work out $125^{-\frac{2}{3}}$

Give your answer as a fraction.

.....

.....

.....

Answer ..... *(2 marks)*

12

19 (a) Find the value of m when $\sqrt{75} - \frac{9}{\sqrt{3}} = m\sqrt{3}$

.....

.....

.....

.....

Answer $m =$ ..... *(3 marks)*

(b) Given that $r = \sqrt{6}$, $s = \sqrt{8}$, and $t = \sqrt{12}$

(i) Simplify fully, $\frac{t}{rs}$

.....

.....

.....

.....

Answer ..... *(2 marks)*

(ii) Show that $\frac{r+t}{2+s} = \frac{\sqrt{6}}{2}$

.....

.....

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.....

.....

(2 marks)

END OF QUESTIONS

7

There are no questions printed on this page

SPECIMEN MARK SCHEME 2008

Module 3 Higher Tier

Q	Answers	Mark	Comments
1	110×15	M1	1650
	£16.50	A1	
	$(150 - 110 - 7) \times 10$	M1	Or 33×10, 330, 3.30
	19.80	A1	
2	$(26000 - 5000) \times \frac{22}{100}$	M1	
	4620	A1	
3a	3	B1	
3b	Plot points	B1ft	
	Draw curve	B1	
3c	1.1 – 1.4	B1	
4	$560 \div 8 \times 7$	M1	
	490	A1	70 SC1
5	$10000 \times \frac{4}{100}$ (400)	M1	
	Their $10400 \times \frac{4}{100} = 416$ and their $10816 \times \frac{4}{100}$ = (432.64)	M1 dep	10000×1.04^3 M2
	1248.64	A1	
6a	14.5	B1	
6b	15.5	B1	Accept 15.49 … or $15.4\dot{9}$
7	$94.50 \div 126$	M1	
	$\times 100$	M1 dep	$94.50 \div 1.26$ M2
	75	A1	
	94.50 – 3.50 – their 75	B1ft	16
	Their $16 \div$ their 75×100	M1	
	21.3(…)	A1 ft	

Q	Answers	Mark	Comments
8a	$F \propto \frac{1}{d^2}$ or $F = \frac{k}{d^2}$	M1	Or $d^2 \propto \frac{1}{F}$
	$28 = \frac{k}{1.5^2}$ ($k = 63$)	M1 dep	
	$F = \frac{63}{d^2}$	A1	Or $Fd^2 = 63$ or $d^2 = \frac{63}{F}$ o.e.
8b	$43.75 = \frac{63}{d^2}$	M1 dep	Dep on M2 in (a)
	1.2	A1	
9	Their min 1200 – their max 280 (1150 – 285 = 865)	M1	Their min 1200 must be 1100 < min < 1200 Their max 280 must be 280 < max < 290
	Either 1150 or 285 correct	A1	
	Their 865 ÷ their max 65 (865 ÷ 65.5)	M1	Their max 65 must be 65 < max < 66
	13	A1	13 no working SC1
10	50 – (23 + 8 + 5)	M1	14 seen
	Their 14 ÷ 50 × 100	M1	Their 14 × 2
	28	A1	
11	252 ÷ time	M1	
	252 ÷ 4.5	M1	
	56	A1	
12	–3 should be –10	B1	$–5(a + 2) = –5a – 10$;
13	$\frac{500 \times 6}{0.3}$	M1	Any two correct
	$\frac{500 \times 6 \times 10}{3}$	M1	oe
	10000	A1	
14	360 = 2 (×) 180	M1	3 (×) 120 or 5 (×) 72
	$2 \times 2 \times 2 \times 3 \times 3 \times 5$	A1	Condone missing × signs here
	$2^3 \times 3^2 \times 5$	A1	Do not accept factor of 1

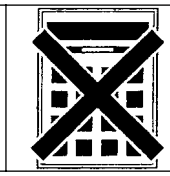
Q	Answers	Mark	Comments
	$2\frac{2}{5} \times 1\frac{3}{4}$	M1	
15	$\frac{12}{5} \times \frac{7}{4}$	M1 dep	84/20, 42/10, 21/5
	$4\frac{1}{5}$	A1	
16	83000000 - 7300000	M1	
	75700000	A1	7.57×10^7, 7.6×10^7, 76000000 26000000 or 2.6×10^7 SC1 50700000 or 5.07×10^7 or 51000000 or 5.1×10^7 SC1
17a	–6	B1	
17b	$-3 \times -3 = 9$	B1	$(0 - 3)^2 = 9$ or $(-3)^2 = 9$
18a	$9 \times \frac{1}{8}$	B1, B1	
	$1\frac{1}{8}$	B1	
18b	$\frac{1}{5^2}$	M1	$\frac{1}{\sqrt[3]{15625}}$; $5^2 = 25$
	$\frac{1}{25}$	A1	
19a	$5\sqrt{3} - \frac{9\sqrt{3}}{3}$	M1, M1	$\sqrt{3} \times \sqrt{75} - 9 = m\sqrt{3} \times \sqrt{3}$ M1 $15 - 9 = 3m$ M1
	2	A1	
19bi	$\frac{\sqrt{12}}{\sqrt{48}}$	M1	$\sqrt{\frac{12}{48}}$, $\sqrt{\frac{1}{4}}$, $\sqrt{\frac{2}{8}}$, or any equivalent simplification
	$(\pm)\ \frac{1}{2}$	A1	
19bii	Either $\sqrt{6} + \sqrt{2}\sqrt{6} = \sqrt{6}(1 + \sqrt{2})$ or $2 + \sqrt{2} = 2(1 + \sqrt{2})$	M1	
	$\frac{\sqrt{6}(1 + \sqrt{2})}{2(1 + \sqrt{2})}$	A1	

General Certificate of Secondary Education

MATHEMATICS (SPECIFICATION B) **43005/1F**
Module 5 Foundation Tier
Paper 1 Non-Calculator

F

Specimen Paper (Two-Tier Specification) 2008

For this paper you must have: • mathematical instruments. You must **not** use a calculator.	

Time allowed: 1 hour 15 minutes

Instructions

- Use blue or black ink or ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- Answer the questions in the spaces provided.
- Do all rough work in this book.

Information

- The maximum mark for this paper is 70.
- The marks for questions are shown in brackets.
- You may ask for more answer paper, graph paper and tracing paper. This must be tagged securely to this answer book.

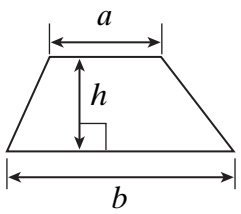
Advice

- In all calculations, show clearly how you work out your answer.

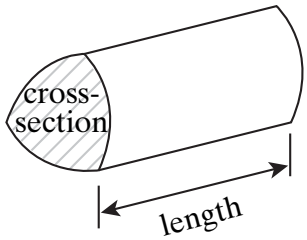
For Examiner's Use	
Pages	Mark
3	
4–5	
6–7	
8–9	
10–11	
12–13	
14–15	
16	
TOTAL	
Examiner's Initials	

Formulae Sheet: Foundation Tier

Area of trapezium = $\frac{1}{2}(a+b)h$



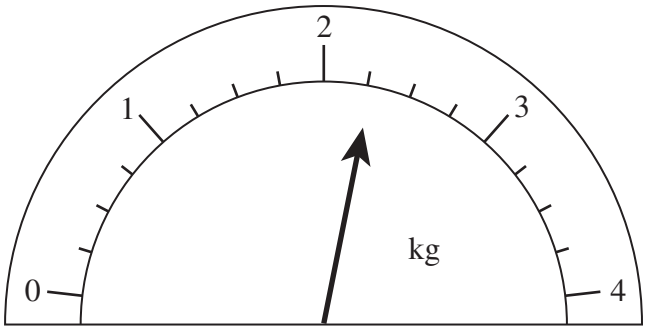
Volume of prism = area of cross-section × length



LEAVE MARGIN BLANK

Answer **all** questions in the spaces provided.

1 The diagram shows a weighing scale.



(a) Put a circle around the correct reading.

$2\frac{1}{10}$ $2\frac{1}{5}$ $2\frac{1}{4}$ $2\frac{1}{2}$ $2\frac{3}{4}$

(1 mark)

(b) Write your answer to part (a) as a decimal.

Answer ..... *(1 mark)*

(c) The weight increases by 1 kg.

Mark the new position of the arrow on the diagram.

(1 mark)

(d) Convert $5\frac{1}{4}$ kilograms into grams.

.....

Answer ..... grams *(2 marks)*

5

2 Here is a list of numbers.

1 2 3 12 15

(a) (i) Write down a multiple of 6 from the list.

Answer ..... *(1 mark)*

(ii) Write down a multiple of 5 from the list.

Answer ..... *(1 mark)*

(b) 30 is a multiple of both 5 and 6.

Write down a different number that is a multiple of both 5 and 6.

Answer ..... *(1 mark)*

3 Here is a sequence of equations.

$x + 5 = 20$
$x + 4 = 19$
$x + 3 = 18$

(a) Write down the next **two** lines of the pattern.

Answer .....

..... *(2 marks)*

(b) Write down the value of x.

Answer ..... *(1 mark)*

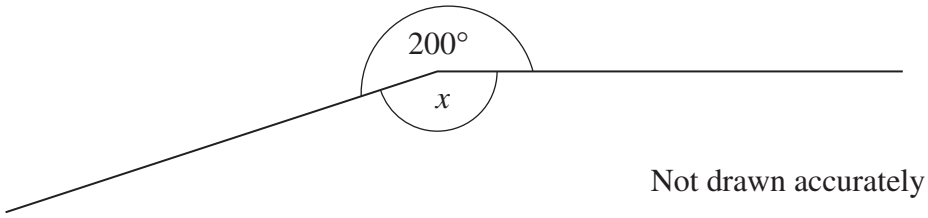
LEAVE MARGIN BLANK

4 (a) Work out 100 – 39

.....

Answer ..... *(1 mark)*

(b)



Not drawn accurately

Work out the value of x.

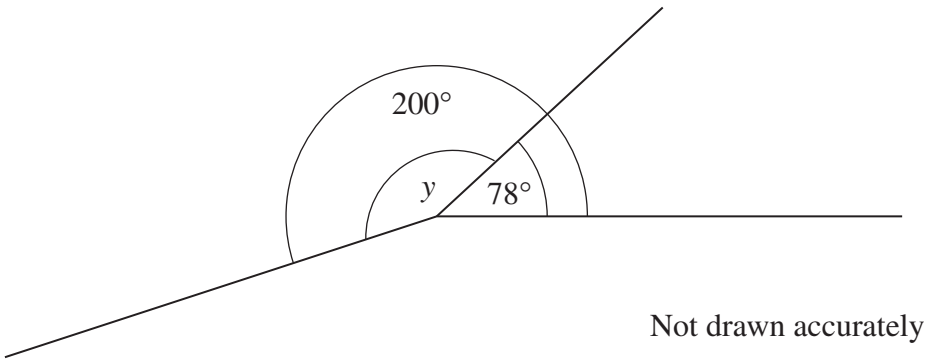
.....

Answer ..... degrees *(2 marks)*

(c) What type of angle is 200°?

Answer ..... *(1 mark)*

(d)



Not drawn accurately

Work out the value of y.

.....

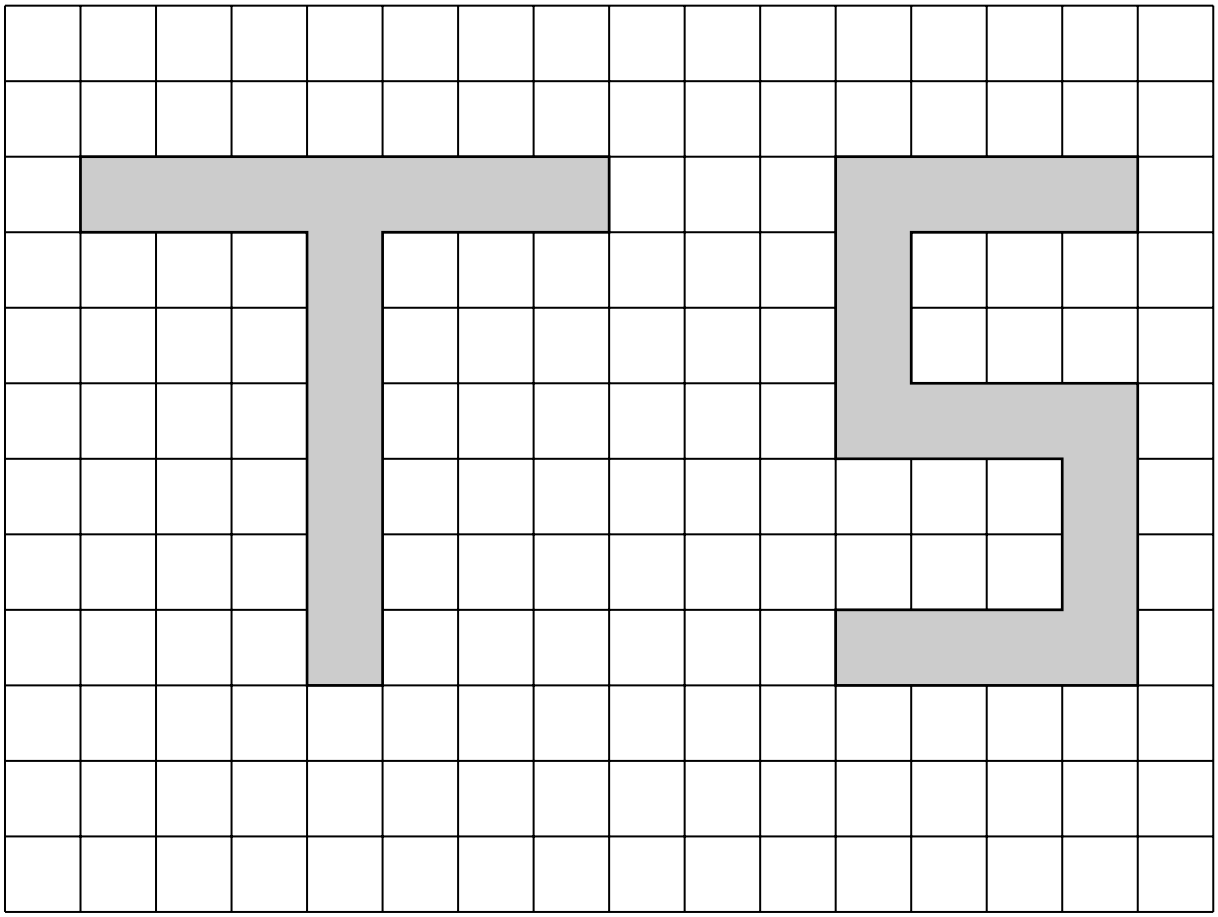
.....

Answer ..... degrees *(2 marks)*

12

Turn over ►

5 Here are two letters, T and S, on a centimetre square grid.



Which letter has the greater area?
You **must** show your working.

.....

.....

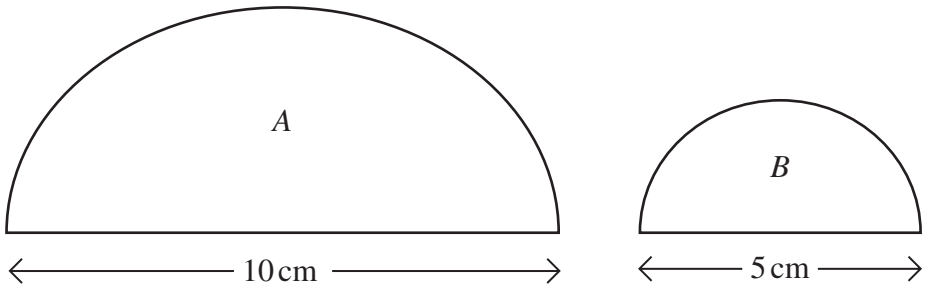
.....

.....

(3 marks)

LEAVE MARGIN BLANK

6 The diagram shows two semicircles *A* and *B*.



Write true or false for each statement.

(a) *A* and *B* are congruent.

Answer ..... *(1 mark)*

(b) *A* and *B* are similar.

Answer ..... *(1 mark)*

(c) The diameter of *A* is twice the diameter of *B*.

Answer ..... *(1 mark)*

(d) The perimeter of *A* is twice the perimeter of *B*.

Answer ..... *(1 mark)*

Turn over for the next question

7

7 Complete the equivalent fractions.

(a) $\frac{3}{5} = \frac{\square}{15}$

(1 mark)

(b) $\frac{2}{\square} = \frac{4}{14}$

(1 mark)

(c) $\frac{6}{11} = \frac{24}{\square}$

(1 mark)

8 Which is greater, 3^2 or $\sqrt{70}$?
You **must** show your working.

.....

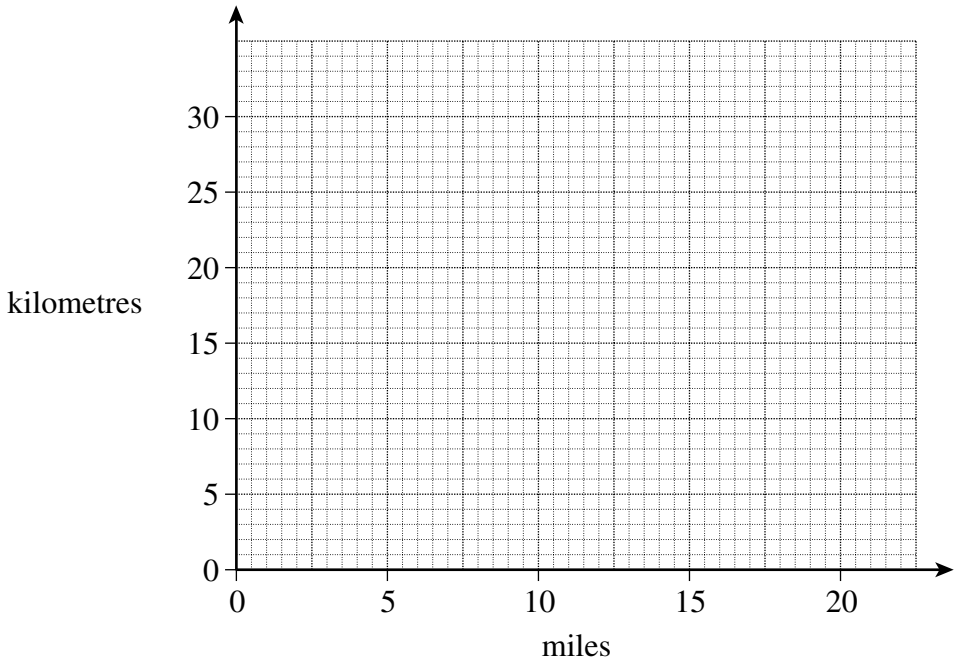
.....

.....

Answer ..... *(3 marks)*

LEAVE MARGIN BLANK

9 The diagram shows a conversion graph.



5 miles = 8 kilometres
15 miles = 24 kilometres

(a) Plot these values on the grid.

(1 mark)

(b) Join the points with a straight line.

(1 mark)

(c) Use the graph to convert 12 miles to kilometres.

.....

Answer ..... km *(2 marks)*

10

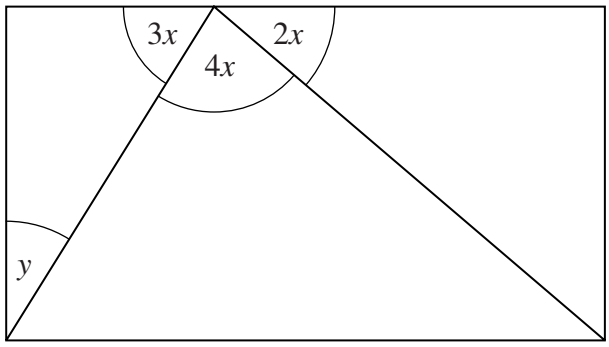
LEAVE MARGIN BLANK

10 (a) Simplify $2x + 3x + 4x$

.....

Answer ..... *(1 mark)*

(b) The diagram shows a triangle inside a rectangle.



Not drawn accurately

(i) Work out the value of x.

.....

.....

.....

Answer ..... degrees *(2 marks)*

(ii) Work out the value of y.

.....

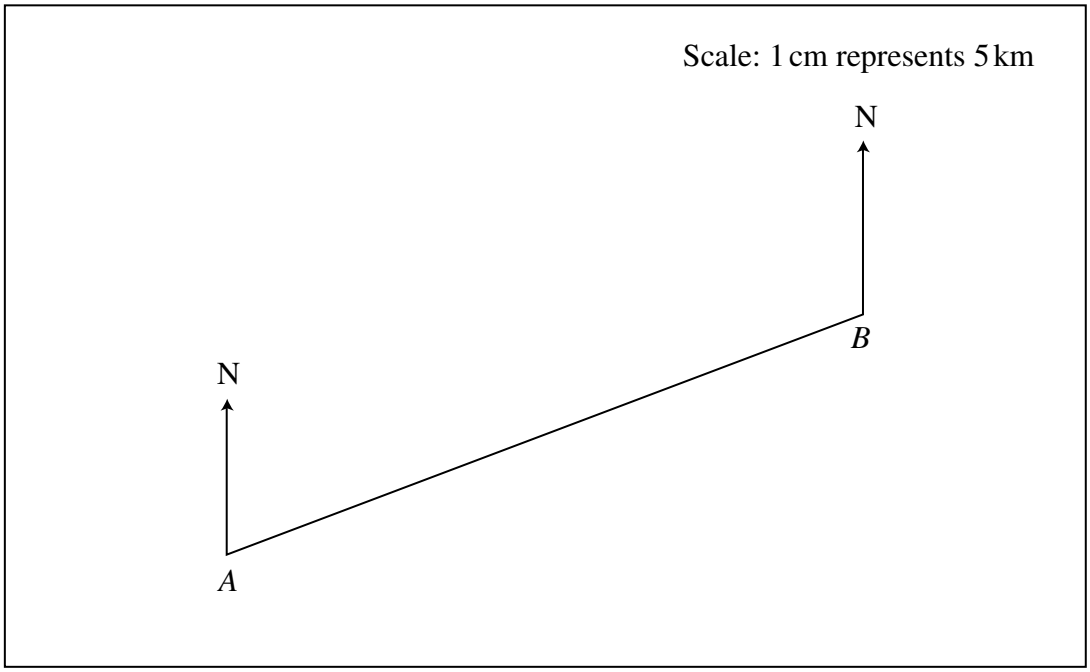
.....

.....

Answer ..... degrees *(3 marks)*

LEAVE MARGIN BLANK

11 The diagram shows the position of two towns *A* and *B*.



(a) Measure the length of *AB* in centimetres.

Answer ..... cm *(1 mark)*

(b) Use the scale to work out the actual distance between the towns *A* and *B*.
Give your answer in kilometres.

.....

Answer ..... km *(2 marks)*

(c) Measure and write down the three-figure bearing of *B* from *A*.

Answer ..... ° *(1 mark)*

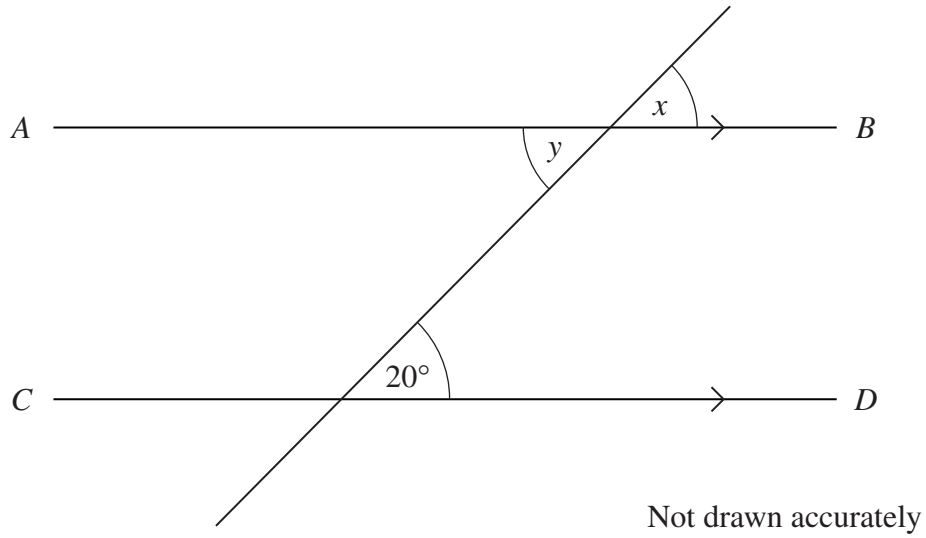
(d) *C* is due east of *A* and due south of *B*.

Mark the position of *C* on the diagram.

(2 marks)

12

12 The lines *AB* and *CD* are parallel.



Not drawn accurately

(a) State the value of *x*.
Give a reason for your answer.

Answer x = ... degrees

Reason .....

.....

(2 marks)

(b) Write down the value of *y*.

Answer y = ... degrees *(1 mark)*

13 Use the formula $v = u + 10t$ to work out u when $v = -4$ and $t = 7$

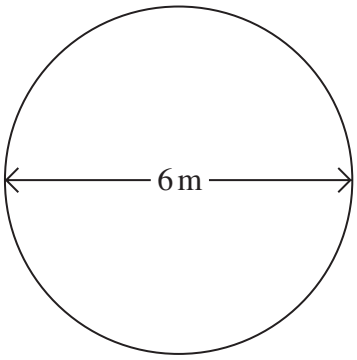
.....

.....

.....

Answer $u =$ ..... *(3 marks)*

14 Jasmin has a pond in her garden.
The surface of the pond is a circle of diameter 6 metres.



Calculate the area of a circle of diameter 6 metres.
Give your answer in terms of π.

.....

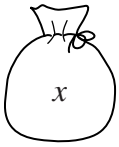
.....

Answer ..... m^2 *(2 marks)*

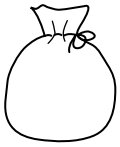
8

15 Bag *A* contains x counters.
Bag *B* contains 8 more counters than bag *A*.
Bag *C* contains twice as many counters as bag *A*.

(a) Write down the number of counters in bags *B* and *C*.



Bag A


Bag B


Bag C

.....

.....

.....

Answer Bag *B* ..... counters

Bag *C* ..... counters *(2 marks)*

(b) Show that the total number of counters in bags *A*, *B* and *C* is $4(x + 2)$

.....

.....

.....

.....

.....

.....

(2 marks)

16 (a) Complete the table of values for $y = x^2 - 3$

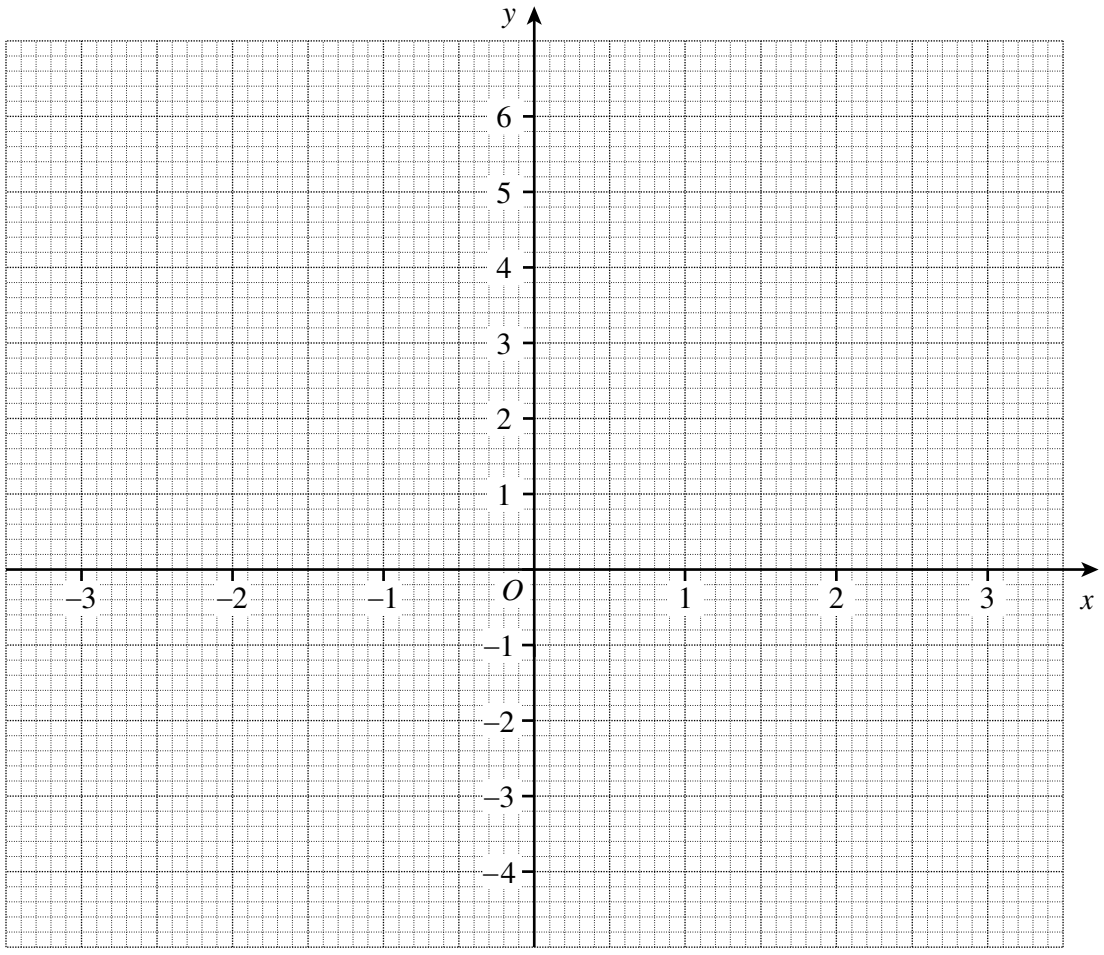
x	–3	–2	–1	0	1	2	3
y		1	–2	–3	–2		6

.....

.....

(1 mark)

(b) On the grid draw the graph of $y = x^2 - 3$ for values of x from –3 to +3



(2 marks)

(c) Use the graph to solve $x^2 - 3 = 0$

.....

.....

Answer ..... *(2 marks)*

9

LEAVE MARGIN BLANK

17 (a) Expand and simplify $(x + 5)(x + 4)$

.....

.....

.....

Answer ..... *(2 marks)*

(b) Make t the subject of the formula $w = 2t + v$

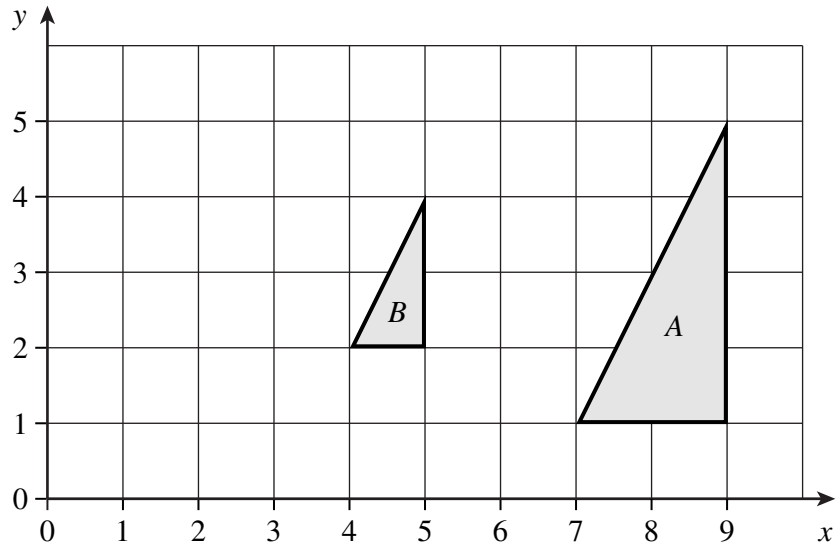
.....

.....

.....

Answer ..... *(2 marks)*

18 The diagram shows two triangles A and B.



Describe fully the single transformation that maps triangle A onto triangle B.

.....

.....

.....

(3 marks)

END OF QUESTIONS

7

There are no questions printed on this page

SPECIMEN MARK SCHEME 2008

Module 5 Paper 1 Foundation Tier

Q	Answers	Mark	Comments
1a	$2\frac{1}{4}$	B1	
1b	2.25	B1ft	
1c	$3\frac{1}{4}$ marked on diagram	B1	
1d	5.25×1000	M1	oe
	5250	A1	
2a	12	B1	
2b	15	B1	
2c	60 or 90 or 120 etc	B1	
3a	$x + 2 = 17$ $x + 1 = 16$	B2	B1 for each line
3b	15	B1	
4a	61	B1	
4b	160	B1	
4c	reflex	B1	
4d	200 – 78 or 2 × their (a)	M1	
	122	A1ft	
5	Attempt to count squares eg 16 or 13 seen	M1	
	Area S = 16 Area T = 13	A1	
	S	A1	
6a	False	B1	
6b	True	B1	
6c	True	B1	
6d	True	B1	
7a	$\frac{9}{15}$	B1	
7b	$\frac{2}{7}$	B1	
7c	$\frac{24}{44}$	B1	

Q	Answers	Mark	Comments
8	9	B1	
	$9^2 = 81$ or $\sqrt{70} = 8. \ldots$	M1	
	$\sqrt{70} < 9$ or $9 > \sqrt{70}$	A1	
9a	Points plotted correctly	B1	
9b	Points joined with a ruled line	B1	
9c	Reading off at 12 miles	M1	Tolerance 1 mm
	[19, 20]	A1	
10a	$9x$	B1	
10bi	$180 \div 9$	M1	
	20	A1	
10bii	$(3x =)$ 60	B1	
	90 – their 60	M1	
	30	A1	
11a	9	B1	Allow [8.9, 9.1]
11b	9×5	M1	
	45	A1ft	
11c	69	B1	Tolerance 1°
11d	69 + 180	M1	
	249	A1	
12a	20	B1	
	Corresponding	B1	
12b	20	B1	
13	$-4 = u + (10 \times 7)$	M1	$v - 10t = u$
	$-4 - 70 = u$	M1	
	$u = -74$	A1	
14	$\pi \times 3 \times 3$	M1	
	9π	A1	

Q	Answers	Mark	Comments
15a	$x + 8$	B1	
	$2x$	B1	
15b	$x + x + 8 + 2x$	M1	
	$4x + 8 = 4(x + 2)$	A1	
16a	6, 1	B1	
16b	Points plotted	B1ft	
	Smooth curve	B1ft	
16c	Reading off at x-axis	M1	
	[1.7, 1.8] and [–1.8, –1.7]	A1ft	sight of 1.7 implies M1
17a	$x^2 + 4x + 5x + 20$	M1	Allow one error
	$x^2 + 9x + 20$	A1	
17b	$w – v = 2t$	M1	
	$(w – v) / 2$	A1	oe
18	Enlargement	B1	
	Scale factor 0.5	B1	
	(1, 3)	B1	

General Certificate of Secondary Education

MATHEMATICS (MODULAR) (SPECIFICATION B) 43005/1H
Module 5 Higher Tier
Paper 1 Non-Calculator

H

Specimen Paper (Two-Tier Specification) 2008

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Pages	Mark
3	
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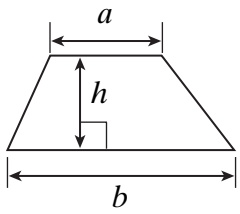
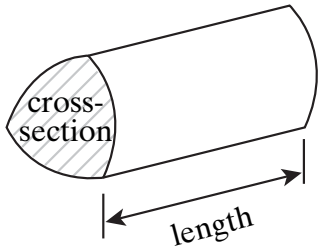
16–17	
18–19	
20	
TOTAL	
Examiner's Initials	

Formulae Sheet: Higher Tier

Area of trapezium = $\frac{1}{2}(a+b)h$

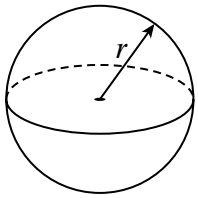


Volume of prism = area of cross-section × length



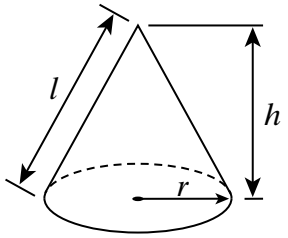
Volume of sphere = $\frac{4}{3}\pi r^3$

Surface area of sphere = $4\pi r^2$



Volume of cone = $\frac{1}{3}\pi r^2 h$

Curved surface area of cone = $\pi r l$

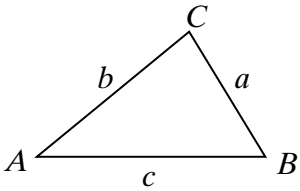


In any triangle ABC

Area of triangle = $\frac{1}{2}ab\sin C$

Sine rule $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Cosine rule $a^2 = b^2 + c^2 - 2bc\cos A$



The Quadratic Equation

The solutions of $ax^2 + bx + c = 0$, where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$

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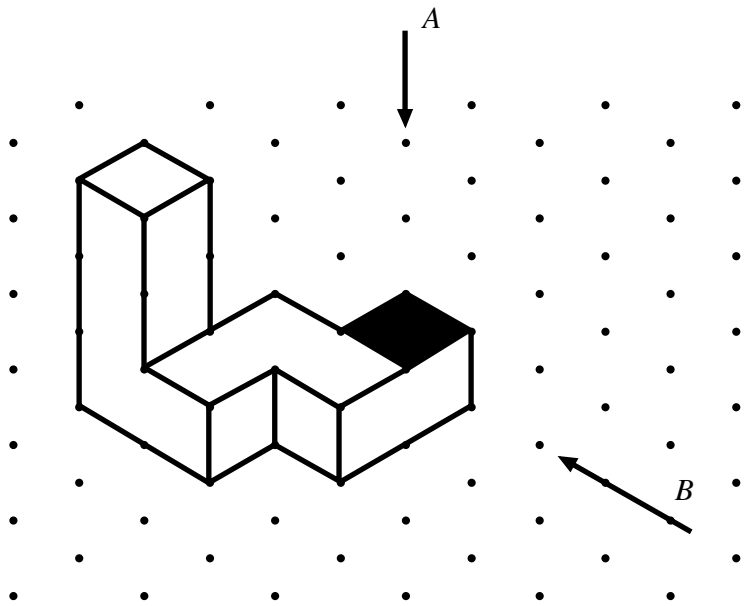
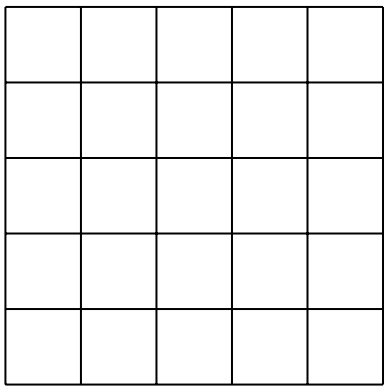
Answer **all** questions in the spaces provided.

1 This 3-D shape is made from seven cubes.
It is drawn on an isometric grid.



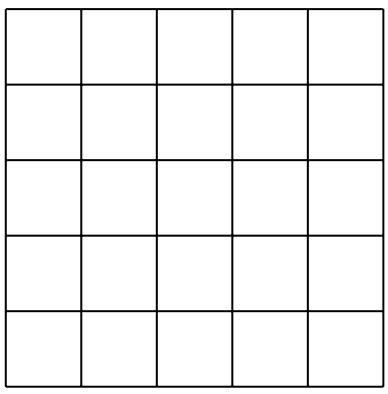
(a) Tim looks down on the shape from *A*.
One of the faces of a cube that he sees is shaded.
Shade all the other faces that he sees. *(1 mark)*

(b) On this grid draw the plan from *A*.



(1 mark)

(c) On this grid draw the front elevation from *B*.



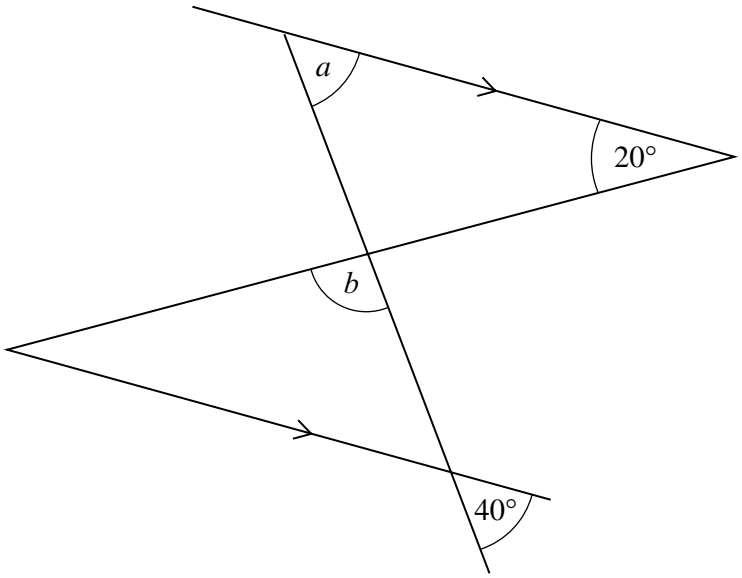
(1 mark)

3

Turn over ►

LEAVE MARGIN BLANK

2 (a) Work out the size of angles a and b.



Not drawn accurately

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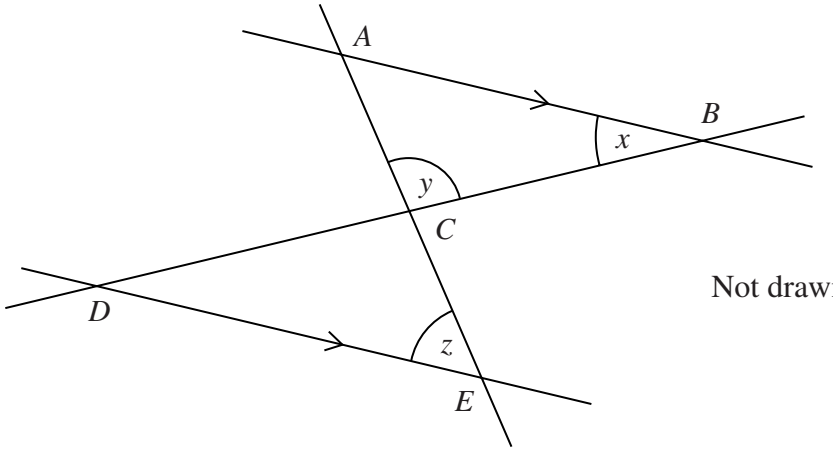
Answer a = ... degrees, b = ... degrees *(3 marks)*

(b) Show that $x + y + z = 180$



Not drawn accurately

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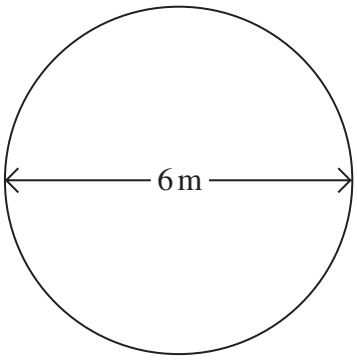
(2 marks)

3 Jasmin has a pond in her garden.
The surface of the pond is a circle of diameter 6 metres.



Calculate the area of a circle of diameter 6 metres.
Give your answer in terms of π.

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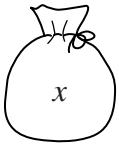
Answer ..... m^2 *(2 marks)*

Turn over for the next question

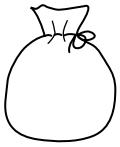
7

4 Bag *A* contains x counters.
Bag *B* contains 8 more counters than bag *A*.
Bag *C* contains twice as many counters as bag *A*.

(a) Write down the number of counters in bags *B* and *C*.



Bag A


Bag B


Bag C

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Answer Bag *B* ..... counters

Bag *C* ..... counters *(2 marks)*

(b) Show that the total number of counters in bags *A*, *B* and *C* is $4(x + 2)$

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(2 marks)

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5 (a) On the grid draw the graph $y = 2x + 3$ for values of x from 0 to 4.

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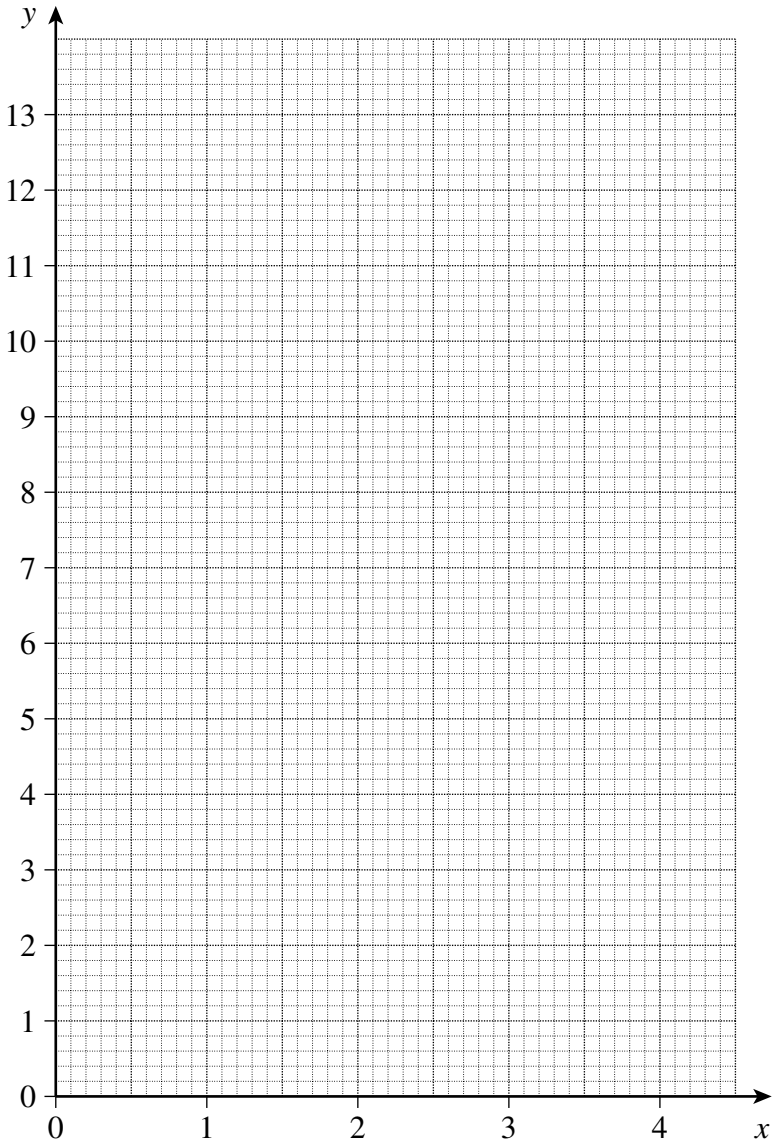

(3 marks)

(b) Solve $2x + 3 = 7.5$

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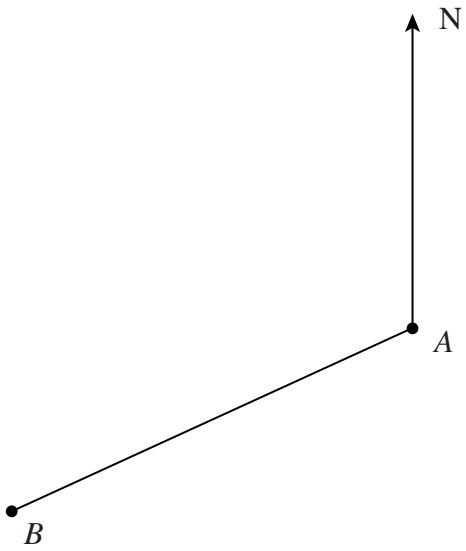
Answer $x =$ ..... *(2 marks)*

9

Turn over ►

6 The diagram shows a scale drawing of two points, *A* and *B*.



(a) Measure and write down the bearing of *B* from *A*.

Answer ..... ° *(1 mark)*

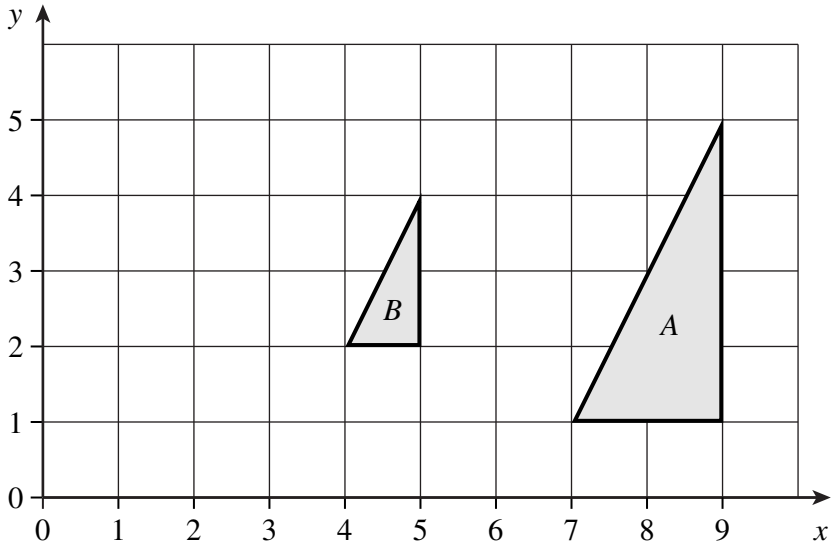
(b) The point *C* is South-East of *A* and on a bearing of 100° from *B*.

Draw the position of *C* on the diagram.

(2 marks)

LEAVE MARGIN BLANK

7 The diagram shows two triangles *A* and *B*.



Describe fully the single transformation that maps triangle *A* onto triangle *B*.

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(3 marks)

Turn over for the next question

6

LEAVE MARGIN BLANK

8 A cuboid is made from centimetre cubes.
The area of the base of the cuboid is $5\,cm^2$.
The volume of the cuboid is $10\,cm^3$.

Work out the surface area of the cuboid.
State the units of your answer.

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Answer ..... *(4 marks)*

LEAVE MARGIN BLANK

9 Here are three fractions.

$$\frac{3}{8} \qquad \frac{5}{16} \qquad \frac{2}{5}$$

Which fraction is closest to $\frac{1}{4}$?

You **must** show your working.

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Answer ..... *(3 marks)*

10 Solve the equation $\frac{x+1}{3} + \frac{x+2}{5} = 1$

You **must** show your working.

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Answer $x =$ ..... *(4 marks)*

11

Turn over ►

LEAVE MARGIN BLANK

11 (a) Expand and simplify $(x + 5)(x + 4)$

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Answer ..... *(2 marks)*

(b) Make t the subject of the formula $w = 2t + v$

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Answer $t =$ ..... *(2 marks)*

(c) Factorise $h^2 - 25$

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Answer ..... *(1 mark)*

12 Solve the equation $z^2 - 8z + 15 = 0$

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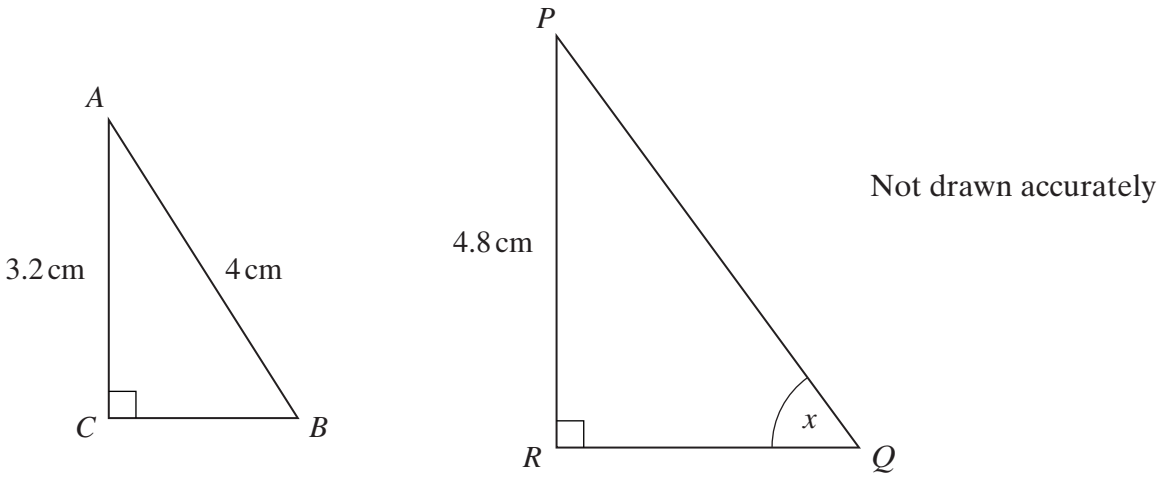
Answer ..... *(3 marks)*

13 Triangles ABC and PQR are similar.
$AC = 3.2\,\text{cm}$, $AB = 4\,\text{cm}$ and $PR = 4.8\,\text{cm}$.



Not drawn accurately

(a) Explain why $\sin x = 0.8$

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(1 mark)

(b) Calculate the length of PQ.

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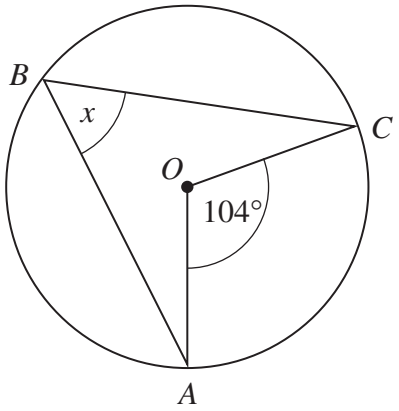
Answer ..... cm *(3 marks)*

12

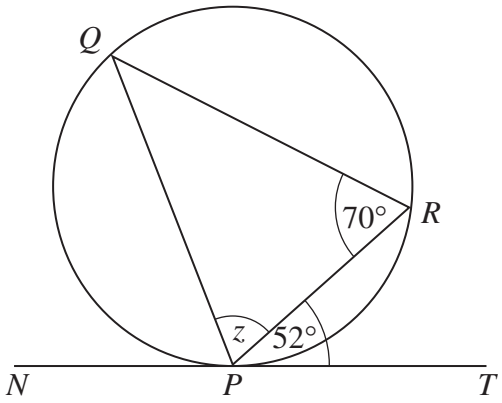
14 (a) *O* is the centre of the circle.
A, *B* and *C* are points on the circumference.

Write down the value of angle *x*.



Answer $x =$ ..... degrees *(1 mark)*

(b) *P*, *Q* and *R* are points on the circumference of the circle.
NPT is the tangent to the circle at *P*.



Not drawn accurately

Calculate the value of *z*.
Give a reason for each step of your working.

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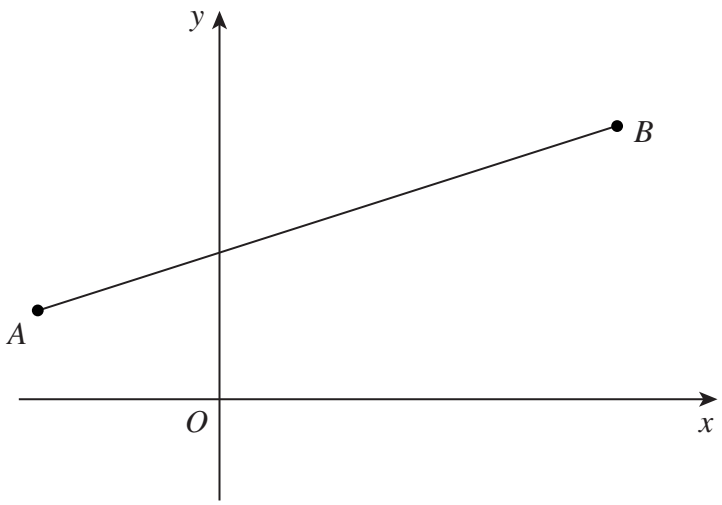
Answer ..... degrees *(3 marks)*

15 The diagram shows the points $A(-2, 2)$ and $B(8, 7)$.



Not drawn accurately

Find the equation of the line perpendicular to AB and passing through $(0, 7)$.

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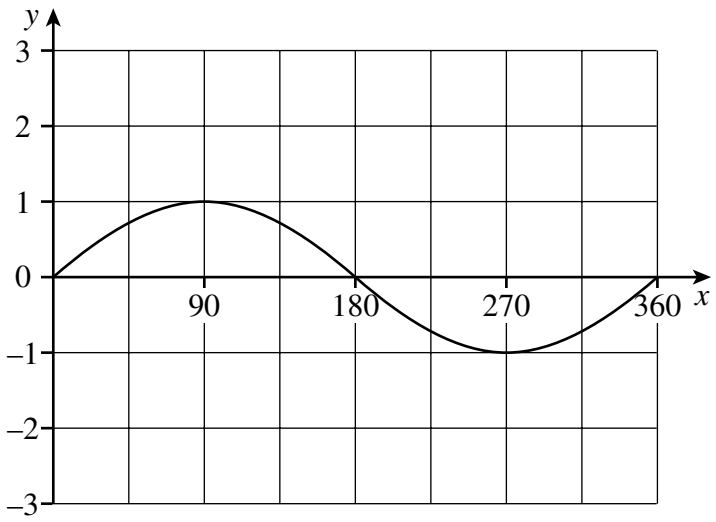
Answer $y =$ ..... *(3 marks)*

Turn over for the next question

7

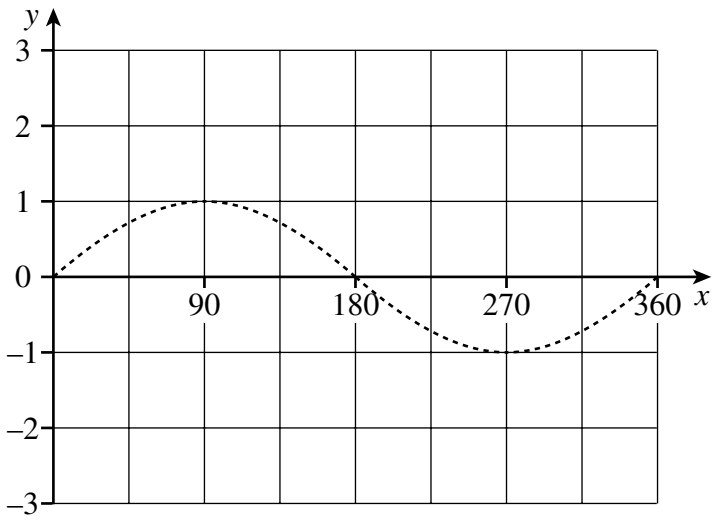
16 This is the graph of $y = \sin x$ for $0° \leqslant x \leqslant 360°$



Draw the graphs indicated for $0° \leqslant x \leqslant 360°$

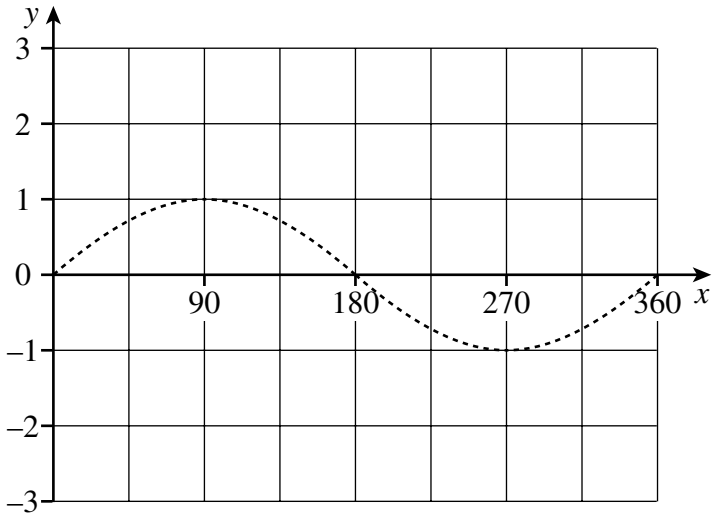
In each case the graph of $y = \sin x$ is shown to help you.

(a) $y = 2\sin x$



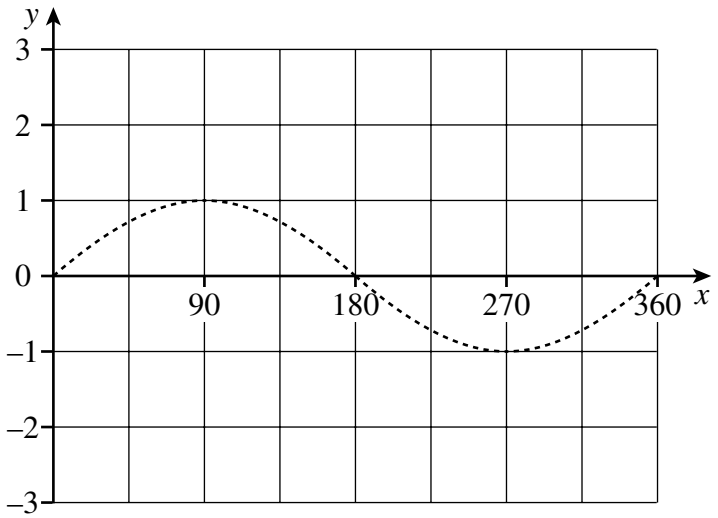
(1 mark)

(b) $y = -\sin x$



(1 mark)

(c) $y = \sin 2x$



(1 mark)

3

17 The triangle number sequence is

1, 3, 6, 10, 15, 21, ……

The nth term of this sequence is given by

$$\frac{1}{2}n(n+1)$$

(a) Write down an algebraic expression for the $(n-1)$th term of the sequence.

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Answer ..... *(1 mark)*

(b) Prove algebraically that the sum of any two consecutive triangle numbers is a square number.

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(3 marks)

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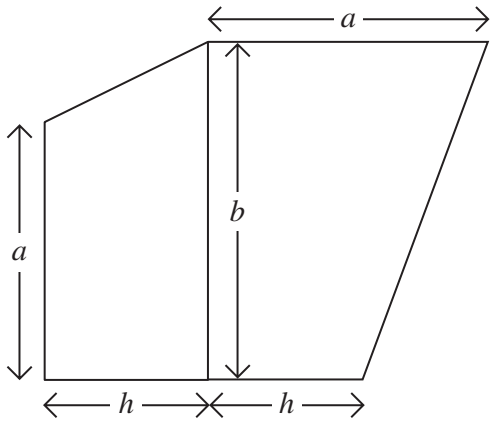
18 A shape is made from two trapezia.



The area of this shape is given by

$$A = \frac{h}{2}(a + b) + \frac{b}{2}(a + h)$$

Rearrange the formula to make a the subject.

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Answer a = ... *(4 marks)*

Turn over for the next question

8

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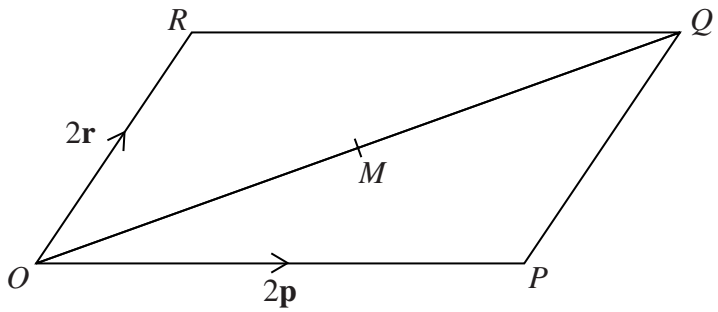
19 *OPQR* is a parallelogram.
M is the midpoint of the diagonal *OQ*.

$\overrightarrow{OP} = 2\mathbf{p}$ and $\overrightarrow{OR} = 2\mathbf{r}$



(a) Express $\overrightarrow{OM}$ in terms of **p** and **r**.

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Answer $\overrightarrow{OM}$ ..... *(1 mark)*

(b) Use vectors to show that *M* is the midpoint of *PR*.

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(3 marks)

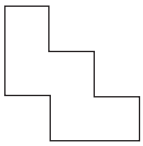
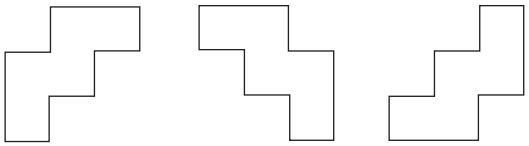
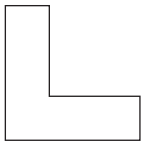
END OF QUESTIONS

4

There are no questions printed on this page

SPECIMEN MARK SCHEME 2008

Module 5 Paper 1 Higher Tier

Q	Answers	Mark	Comments
1a	Correct faces shaded	B1	
1b		B1	
1c		B1	
2a	$a = 40$	B1	allow angles on diagram
	180 – [(their 40) + 20]	M1	
	120	A1	SC1 reversed answers
2b	$\angle BAC = z$, or $\angle CDE = x$ and $\angle DCE = y$	B1	or $\angle BAC = x + z$ allow angles on diagram
	Sum of angles of triangle = 180	B1 dep	Sum of angles on a straight line = 180
3	$\pi \times 3^2$	M1	
	9π	A1	SC1 36π
4a	$x + 8$	B1	
	$2x$	B1	
4b	$x + x + 8 + 2x$	M1	
	$4x + 8 = 4(x + 2)$	A1	Can be shown either way but must be stated SC1 Complete correct numerical verification
5a	Any 2 points calculated from (0, 3), (1, 5), (2, 7), (3, 9), (4, 11)	M1	May be implied from a correct line
	At least 2 of these points correctly plotted	M1	
	Correct ruled line drawn from (0, 1) to (4, 13)	A1	Tolerance ± 1mm from points
5b	$x = \frac{7.5 - 3}{2}$ or attempt to read off at $y = 7.5$	M1	Tolerance ± 1mm if graph used
	$(x =)$ 2.25	A1	±0.05. ft their graph if used
6a	245°	M1	Allow 243° to 247°
6b	Line from A SE ±2° or line from B on bearing 100°±2° from B	M1	
	Both lines to acceptable accuracy intersecting.	A1	

Q	Answers	Mark	Comments
7	Enlargement	B1	
	Scale factor $\frac{1}{2}$	B1	oe eg half as big
	(1, 3)	B1	
8	1 by 5 by 2 identified	B1	or height = 2 or base = 1 by 5
	$2 \times (1 \times 5 + 1 \times 2 + 2 \times 5)$	M1	oe area of 6 faces attempted
	34	A1	
	cm^2	B1	
9	$\frac{30}{80}$ $\frac{25}{80}$ $\frac{32}{80}$ $\left(\frac{20}{80}\right)$ or 0.37(5) 0.31(25) 0.4 (0.25)	M2	M1 for converting 2 of the 3 to fractions or decimals to compare Reciprocal method: 2.66… 3.2 2.5 4 (must compare with all 3) Accept correct diagrams
	$\frac{5}{16}$	A1	
10	$5(x + 1) + 3(x + 2)$	M1	$5x + 5 + 3x + 6$ allow one error in expansion.
	$8x + 11$	A1	
	Their '$8x + 11$' = 15	M1	
	0.5	A1	ft if both Ms awarded.
11a	$x^2 + 5x + 4x + 20$	M1	Must have 4 terms – allow one error
	$x^2 + 9x + 20$	A1	
11b	$2t = w - v$	M1	
	$t = (w - v) \div 2$	A1	oe
11c	$(h - 5)(h + 5)$	B1	
12	$(z \pm a)(z \pm b)$	M1	$ab = 15$
	$(z - 5)(z - 3)$	A1	
	5 and 3	A1ft	ft their brackets if M1 awarded
13a	(sin x =) 3.2/4 or 4.8/6	B1	oe eg $4 \times 0.8 = 3.2$
13b	4.8/3.2 or 1.5	M1	oe $0.8 = 4.8/PQ$
	1.5×4	M1 dep	oe 4.8/0.8
	6	A1	

Q	Answers	Mark	Comments
14a	52°	B1	
14b	52 at Q	M1	or angle NPQ = 70 may be credited from diagram
	(angles in) alternate segment	B1	
	58	A1	58 as answer scores M1A1
15	Attempt $\frac{7-2}{8--2}$	M1	
	Negative reciprocal of their gradient	M1 dep	Must be an attempt at a gradient
	$-2x + 7$	A1	
16a	curve through (0,0) (90,2) (180,0) (270,–2) (360,0)	B1	
16b	curve through (0,0) (90,–1) (180,0) (270,1) (360,0)	B1	
16c	curve through (0,0) (45,1) (90,0) (135,–1) (180,0) (225,1) (270,0) (315,–1) (360,0)	B1	
17a	$\frac{1}{2}n(n-1)$	B1	Or equivalent
17b	$\frac{1}{2}n(n-1) + \frac{1}{2}n(n+1)$	M1	Or equivalent e.g. $\frac{1}{2}n(n+1)+\frac{1}{2}(n+1)(n+2)$
	$\frac{1}{2}n^2 - \frac{1}{2}n + \frac{1}{2}n^2 + \frac{1}{2}n$	A1	$n^2 + 2n + 1$
	n^2	A1	$(n + 1)^2$
18	$2A = ah + bh + ab + bh$	M1	Allow one error Accept $4A = ah/2 + bh/2 + ab/2 + bh/2$
	$2A - 2bh = ah + ab$	A1	$A - bh = ah/2 + ab/2$
	$2A - 2bh = a(h + b)$	M1 dep	For factorising
	$a = \frac{2A-2bh}{h+b}$	A1	Or equivalent
19a	p + r	B1	
19b	PM = – 2p + p + r	M1	or MR = – (p + r) 2r or PR = – 2p + 2r
	PM = – p + r	A1	or MR = – p + r
	PR = 2PM so M is mid-point	A1	

General Certificate of Secondary Education

MATHEMATICS (MODULAR) (SPECIFICATION B) 43005/2F
Module 5 Foundation Tier
Paper 2 Calculator

F

Specimen Paper (Two-Tier Specification) 2008

For this paper you must have: • a calculator • mathematical instruments.	

Time allowed: 1 hour 15 minutes

Instructions

- Use blue or black ink or ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- Answer the questions in the spaces provided.
- Use a calculator where appropriate.
- Do all rough work in this book.
- If your calculator does not have a π button, take the value of π to be 3.14 unless another value is given in the question.

Information

- The maximum mark for this paper is 70.
- The marks for questions are shown in brackets.
- You may ask for more answer paper, graph paper and tracing paper. This must be tagged securely to this answer book.

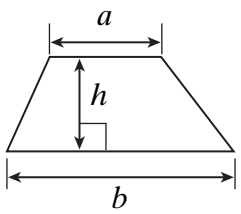
Advice

- In all calculations, show clearly how you work out your answer.

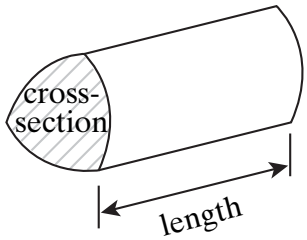
For Examiner's Use	
Pages	Mark
3	
4–5	
6–7	
8–9	
10–11	
12–13	
14–15	
16	
TOTAL	
Examiner's Initials	

Formulae Sheet: Foundation Tier

Area of trapezium = $\frac{1}{2}(a+b)h$

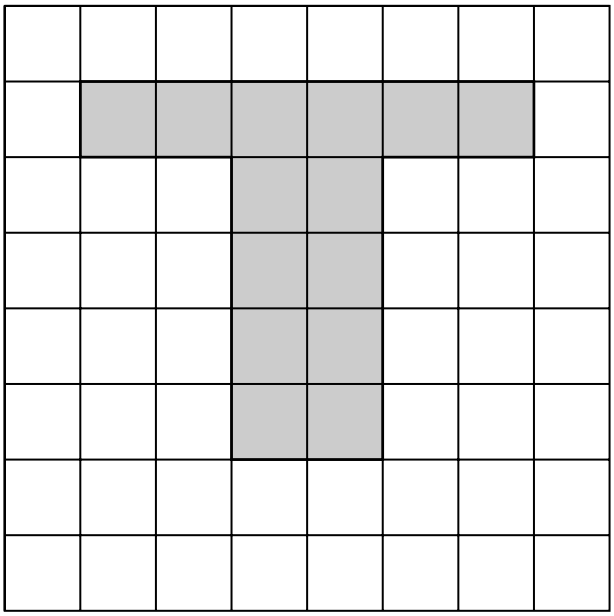


Volume of prism = area of cross-section × length



Answer **all** questions in the spaces provided.

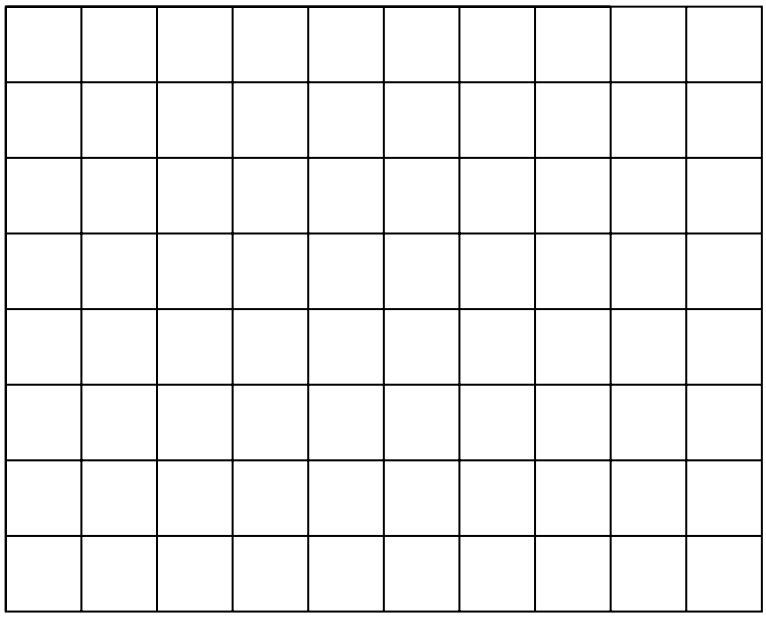
1 This T-shape is drawn on a centimetre square grid.



(a) Find the perimeter of this shape.

Answer ..... cm *(1 mark)*

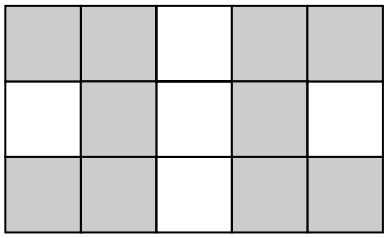
(b) On the grid below draw a rectangle with the same perimeter as the T-shape.



(2 marks)

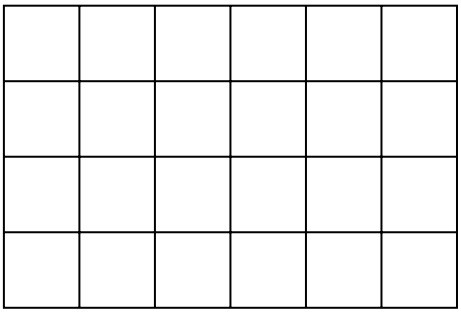
3

2 (a) What fraction of this shape is shaded?



Answer ..... *(1 mark)*

(b) Shade in $\frac{3}{4}$ of this shape.



(1 mark)

(c) Write down a different fraction which is equivalent to $\frac{3}{4}$.

.....

Answer ..... *(1 mark)*

(d) Express $\frac{40}{64}$ as a fraction in its simplest form.

.....

.....

.....

Answer ..... *(2 marks)*

LEAVE MARGIN BLANK

3 (a) Find all the factors of 18.

.....

.....

.....

Answer ..... *(2 marks)*

(b) Write down the factors of 18 which are also factors of 30.

.....

.....

.....

.....

Answer ..... *(2 marks)*

4 A bus company works out its fares using the formula.

Fare = Rate per Mile × No. of miles travelled.

The bus company sets its rate at 20p per mile.

(a) Laura travels 9 miles on the bus.

What fare does she pay?

.....

.....

Answer £ ..... *(2 marks)*

(b) Moeen pays a fare of £3.

How far does he travel?

.....

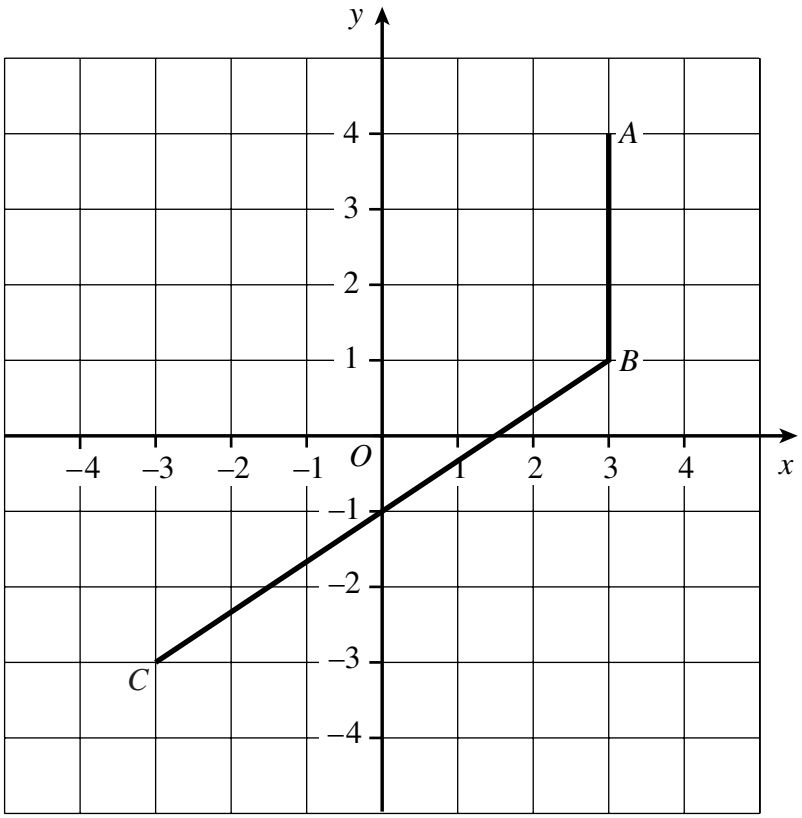
.....

.....

Answer ..... miles *(2 marks)*

13

5 Two sides of a parallelogram are drawn below.



(a) Write down the coordinates of the point *A*.

Answer (..... , ...) *(1 mark)*

(b) Write down the coordinates of the point *C*.

Answer (..... , ...) *(1 mark)*

(c) (i) Draw two lines to complete the parallelogram *ABCD*. *(1 mark)*

(ii) Write down the coordinates of the point *D*.

Answer (..... , ...) *(1 mark)*

LEAVE MARGIN BLANK

6 Here is a sequence of numbers.

128 64 32 x 8 4 y 1

(a) Write down the values of x and y.

Answer $x =$ ..... , $y =$ ..... *(2 marks)*

(b) Write down the rule for continuing the sequence.

.....

.....

(1 mark)

7 (a) Use your calculator to find the square root of 2116.

.....

Answer ..... *(1 mark)*

(b) Use your calculator to work out $\frac{1}{\sqrt{2116}}$

(i) Write down your full calculator display.

.....

Answer ..... *(1 mark)*

(ii) Give your answer to 3 decimal places.

.....

Answer ..... *(1 mark)*

8 Fergus thinks of a number.
He multiplies it by 3 and then adds 8.
The answer is 35.

What is the number?

.....

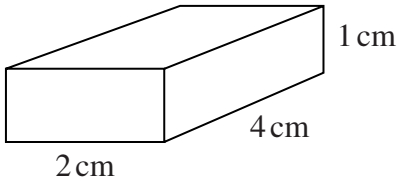
.....

Answer ..... *(2 marks)*

12

Turn over ►

9 The diagram shows a cuboid.



Not drawn accurately

(a) How many faces does a cuboid have?

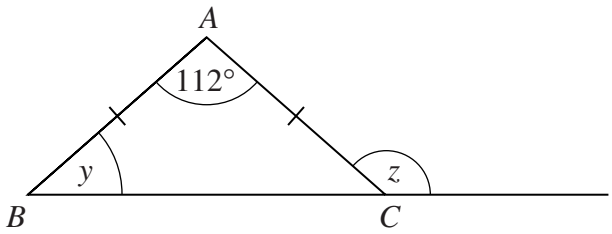
Answer ..... *(1 mark)*

(b) Draw an accurate net of this cuboid on the grid below.

(3 marks)

LEAVE MARGIN BLANK

10 The diagram shows an isosceles triangle ABC.
Angle $BAC = 112°$



(a) Calculate the size of angle y.

.....

.....

Answer $y =$ ..... degrees *(2 marks)*

(b) Write down the size of angle z.

.....

.....

Answer $z =$ ..... degrees *(1 mark)*

11 (a) Factorise $4x - 12$

.....

Answer ..... *(1 mark)*

(b) Factorise $x^2 - 5x$

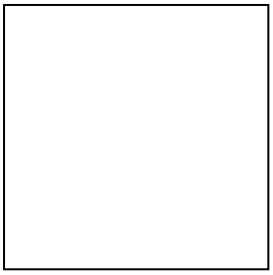
.....

.....

Answer ..... *(1 mark)*

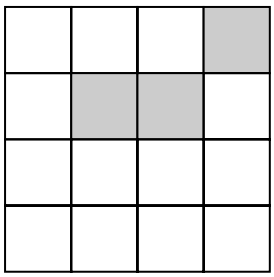
9

12 (a) A square is drawn below.



Draw all the lines of symmetry. *(2 marks)*

(b) Three small squares are shaded in the diagram.



Shade in three more small squares to make a pattern with rotational symmetry order 2.
(2 marks)

LEAVE MARGIN BLANK

13 (a) Simplify $6p + 3q - 2q + 3p$

.....

Answer ..... *(2 marks)*

(b) Multiply out $5(r - 2)$

.....

Answer ..... *(1 mark)*

14 Liz says that 34% of 250 and 25% of 340 are equal.

Is she correct?
Explain your answer.

Answer .....

Explanation .....

.....

.....

.....

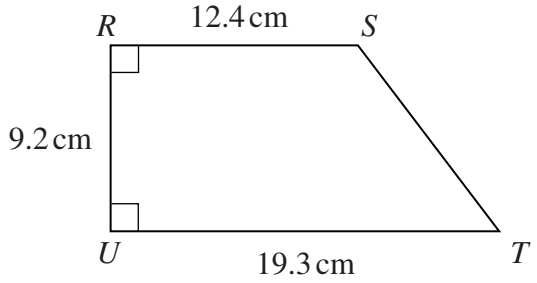
(3 marks)

Turn over for the next question

10

LEAVE MARGIN BLANK

15 In the diagram, $RS = 12.4\,\text{cm}$, $RU = 9.2\,\text{cm}$ and $UT = 19.3\,\text{cm}$
The angles at R and U are 90°



Not drawn accurately

Calculate the area of $RSTU$.

.....

.....

.....

.....

Answer ..... cm^2 *(3 marks)*

LEAVE MARGIN BLANK

16 (a) Solve the equation $x - 11 = 18$

.....

.....

Answer $x =$ ..... *(1 mark)*

(b) Solve the equation $\frac{x}{3} = 4$

.....

.....

Answer $x =$ ..... *(1 mark)*

(c) Solve the equation $2x + 8 = 36$

.....

.....

Answer $x =$ ..... *(2 marks)*

(d) Solve the inequality $3x + 7 \geqslant 4$

.....

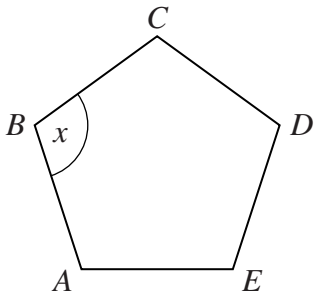
.....

Answer ..... *(2 marks)*

Turn over for the next question

9

17 (a) *ABCDE* is a regular pentagon.



Not drawn accurately

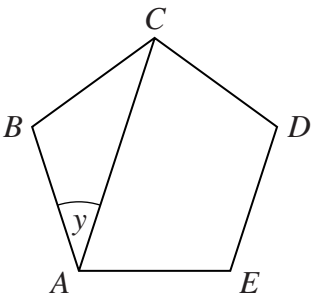
Work out the value of the interior angle *x*.

.....

.....

Answer $x =$ ..... degrees *(2 marks)*

(b) *ABCDE* is a regular pentagon.



Not drawn accurately

Work out the value of *y*.

.....

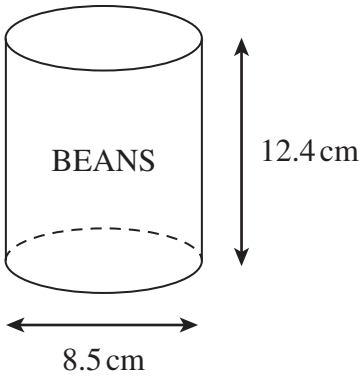
.....

.....

Answer $y =$ ..... degrees *(2 marks)*

LEAVE MARGIN BLANK

18 The diagram shows a cylindrical tin of beans of diameter 8.5 cm and height 12.4 cm.



Not drawn accurately

Calculate the volume of the cylinder.
State the units of your answer.

.....

.....

.....

Answer ..... *(4 marks)*

19 Using trial and improvement, complete the table to find a solution of the equation

$$x^3 - 2x = 90$$

Give your answer to 1 decimal place.

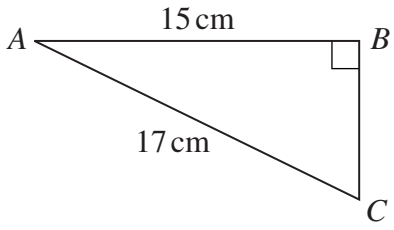
x	$x^3 - 2x$	Comment
4	56	Too low
5	115	Too high

Answer x = ... *(3 marks)*

11

Turn over ►

20 ABC is a right-angled triangle.
$AB = 15\,\text{cm}$ and $AC = 17\,\text{cm}$



Not drawn accurately

Calculate the length of the side BC.

.....

.....

.....

.....

.....

Answer ..... cm *(3 marks)*

END OF QUESTIONS

3

There are no questions printed on this page

SPECIMEN MARK SCHEME 2008

Module 5 Paper 2 Foundation Tier

Q	Answers	Mark	Comments
1a	22	B1	
1b	Rectangle attempted	M1	
	any correct rectangle	A1ft	ft their (a)
2a	$\frac{2}{3}$	B1	oe
2b	Shading 18 squares	B1	
2c	$\frac{6}{8}$	B1	oe
2d	$\frac{5}{8}$	B2	B1 for $\frac{10}{16}$ or $\frac{20}{32}$ Do not accept a decimal
3a	1, 2, 3, 6, 9, 18	B2	B1 for any 4 or 5 of these, could be in working
3b	1, 2, 3, 5, 6, 10, 15, 30	B1	
	1, 2, 3, 6	B1	
			In each section deduct 1 mark only for extra, wrong factors on the answer line
4a	9×20	M1	or $9 \times 0.20 + 0.35$ or digits 215 seen
	£1.80	A1	Accept 180p if the £ sign is deleted
4b	$300 \div 20$	M1	
	15	A1	
5a	(3,4)	B1	
5b	(–3,–3)	B1	SC1, for both (a) and (b) reversed
5ci	2 lines parallel to AB and BC forming parallelogram	B1	2mm tolerance on each line
5cii	(–3,0)	B1ft	Their correct coordinates for D
6a	$x = 16,\ y = 2$	B1,B1	
	Divide by 2	B1	oe
7a	46	B1	
7b	0.0217391	B1	
	0.022	B1	
8	subtract 8 then divide by 3	M1	
	9	A1	

Q	Answers	Mark	Comments
9a	6	B1	
9b	Correct net	B3	B2 for correct net for open topped cuboid B1 for 3 rectangles correctly linked 2mm tolerance throughout
10a	(180 – 112) / 2	M1	
	34	A1	
10b	146	B1ft	180 – their (y)
11a	$4(x - 3)$	B1	
11b	$x(x - 5)$	B1	
12a	All four lines	B2	Correct intention B1 for any two correct
12b	Any correct diagram	B2	B1 for any correct rotational symmetry
13a	$9p + q$	B2	B1 for $9p$ or $(+)q$ B1 for $9\times p + (1) (\times) q$ Penalise incorrect notation once in question
13b	$5r - 10$	B1	
14	A completely correct method of either percentage	M1	Eg 0.34×250 $340 \div 4$ oe
	85	A1	For 85 seen once
	Yes or Liz is correct	B1 dep	Dependent on M1 awarded
15	$0.5 \times (12.4 + 19.3) \times 9.2$	M2	M1 splitting into rectangle and a triangle M1 rectangle 9.2×12.4, triangle 6.9×9.2
	145.82, or 145.8, or 146	A1	
16a	29	B1	
16b	12	B1	
16c	$2x = 28$	M1	$x + 4 = 18$
	14	A1	
16d	$3x \geqslant -3$	M1	
	$x \geqslant -1$	A1	
17a	$540 \div 5$	M1	External angle 360 / 5 (or 72 seen)
17b	108	A1	
	(180 – their 108) ÷ 2	M1	108 – 72 or 180 – 72 – 72
	36	A1	

Q	Answers	Mark	Comments
18	$3.14\ (0.5 \times 8.5^2) \times 12.4$	M2	M1 for $3.14\ (0.5 \times 8.5)$ or 56.7… seen
	703.28 to 703.73	A1	or 704
	cm^3	B1	
19	Guess between 4 and 5	M1	Must be evaluated correctly to at least nearest whole number (4.1, 60.721), (4.2, 65.688), (4.3, 70.907) (4.4, 76.384), (4.5, 82.125), (4.6, 88.136) (4.7, 94.423), (4.8, 100.992), (4.9, 107.849)
	Bracketing answer between 4.6 and 4.7 (inclusive)	M1	Any values between 4.6 and 4.7 that Bracket answer
	Testing a value $\leqslant 4.65$ and $>$ actual answer (4.6301141) and stating answer as 4.6	A1ft	(4.65, 91.244625), (4.64, 90.617344)
20	$17^2 - 15^2\ (= 64)$	M1	or $x^2 + 15^2 = 17^2$
	$\sqrt{64}$	M1 dep	For squaring, subtracting and indication of square rooting
	8	A1	

General Certificate of Secondary Education

MATHEMATICS (MODULAR) (SPECIFICATION B) 43005/2H
Module 5 Higher Tier
Paper 2 Calculator

H

Specimen Paper (Two-Tier Specification) 2008

For this paper you must have: • a calculator • mathematical instruments.	

Time allowed: 1 hour 15 minutes

Instructions

- Use blue or black ink or ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- Answer the questions in the spaces provided.
- Use a calculator where appropriate.
- Do all rough work in this book.
- If your calculator does not have a π button, take the value of π to be 3.14 unless another value is given in the question.

Information

- The maximum mark for this paper is 70.
- The marks for questions are shown in brackets.
- You may ask for more answer paper, graph paper and tracing paper. This must be tagged securely to this answer book.

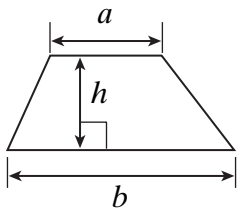
Advice

- In all calculations, show clearly how you work out your answer.

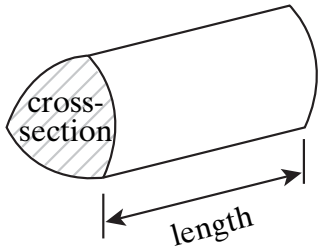
For Examiner's Use	
Pages	Mark
3	
4–5	
6–7	
8–9	
10–11	
12–13	
14–15	
16	
TOTAL	
Examiner's Initials	

Formulae Sheet: Higher Tier

Area of trapezium = $\frac{1}{2}(a+b)h$

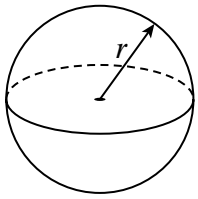


Volume of prism = area of cross-section × length



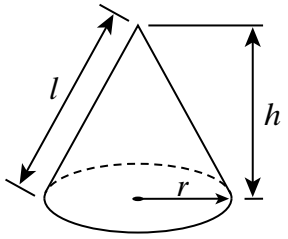
Volume of sphere = $\frac{4}{3}\pi r^3$

Surface area of sphere = $4\pi r^2$



Volume of cone = $\frac{1}{3}\pi r^2 h$

Curved surface area of cone = $\pi r l$

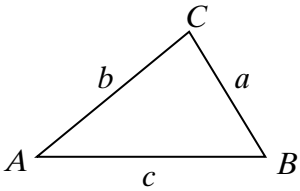


In any triangle ABC

Area of triangle = $\frac{1}{2}ab\sin C$

Sine rule $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Cosine rule $a^2 = b^2 + c^2 - 2bc\cos A$



The Quadratic Equation

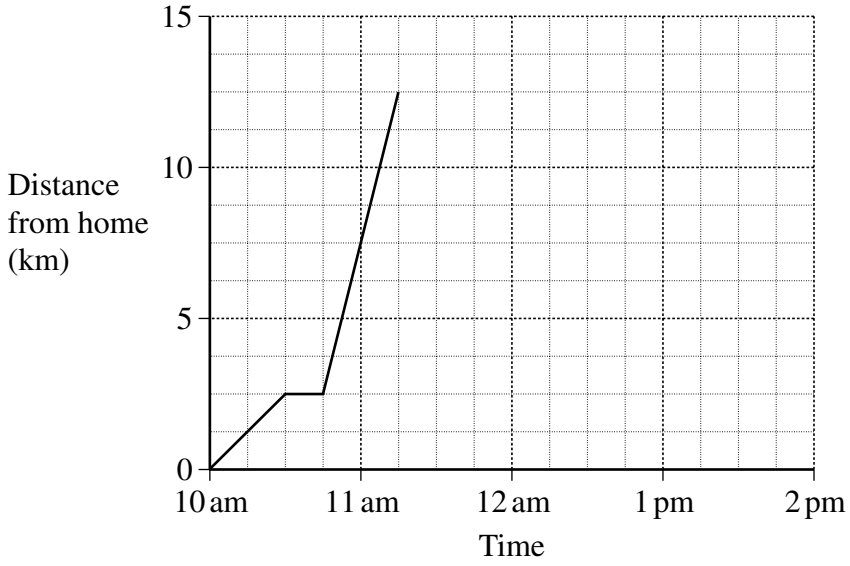
The solutions of $ax^2 + bx + c = 0$, where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$

LEAVE MARGIN BLANK

Answer **all** questions in the spaces provided.

1 Mr Smith leaves the home at 10 am to go to the shopping mall.
He walks to the station where he catches a train.
He gets off the train at the mall.
The travel graph shows his journey.



After shopping Mr Smith goes home by taxi.
The taxi leaves the mall at 1 pm and arrives at his home at 1.45 pm.

(a) Complete the travel graph. *(2 marks)*

(b) Calculate the average speed of the taxi.

.....

.....

.....

.....

Answer ..... km per hour *(2 marks)*

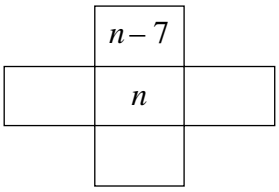
4

2 (a) Part of a number grid is shown below.

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	32	33	34	35

The shaded cross is called C_{11} because it has the number 11 at the centre.

This is C_n



Fill in the empty boxes.

(2 marks)

(b) Kevin notices the following number sequence in the grid.

1, 9, 17, 25, 33, …

Write down the nth term of this sequence.

.....

.....

.....

.....

Answer ..... *(2 marks)*

LEAVE MARGIN BLANK

3 (a) k is an even number.
Jemma says that $\frac{1}{2}k + 1$ is always even.

Give an example to show that Jemma is wrong.

.....

.....

.....

(1 mark)

(b) p and q are both odd numbers.
p is greater than q.

Is $p - q$ an odd number, an even number, or could it be either?
Tick the correct box.

☐ odd ☐ even ☐ either

(1 mark)

4 (a) Multiply out $x(x - 7)$

.....

Answer ..... *(1 mark)*

(b) Factorise $4x - 12$

.....

Answer ..... *(1 mark)*

(c) Factorise $x^2 - 5x$

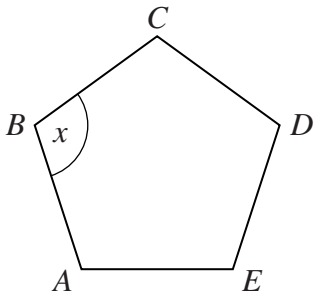
.....

Answer ..... *(1 mark)*

9

Turn over ►

5 (a) *ABCDE* is a regular pentagon.



Not drawn accurately

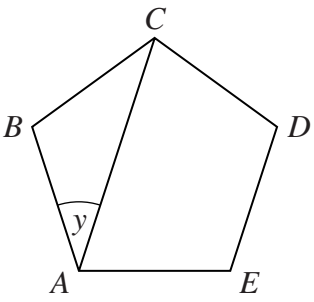
Work out the value of the interior angle *x*.

.....

.....

Answer $x =$ ..... degrees *(2 marks)*

(b) *ABCDE* is a regular pentagon.



Not drawn accurately

Work out the value of *y*.

.....

.....

.....

Answer $y =$ ..... degrees *(2 marks)*

6 Solve the equations.

(a) $4x - 5 = 7$

.....

.....

Answer $x =$ ..... *(2 marks)*

(b) $5y + 11 = 3(y + 7)$

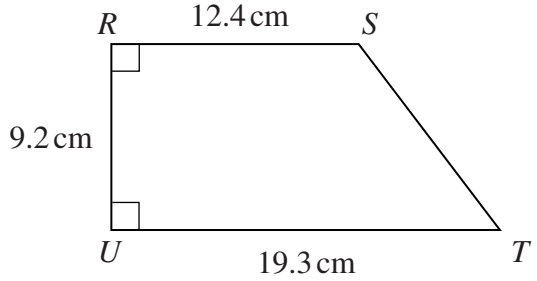
.....

.....

.....

Answer $y =$ ..... *(3 marks)*

7 In the diagram, $RS = 12.4\,\text{cm}$, $RU = 9.2\,\text{cm}$ and $UT = 19.3\,\text{cm}$
The angles at R and U are 90°.



Not drawn accurately

Calculate the area of $RSTU$.

.....

.....

.....

.....

Answer ..... cm^2 *(3 marks)*

12

8 (a) Using a ruler and compasses only, construct an angle of 60°.
Show all your construction lines and arcs.

(2 marks)

(b) Two lifeboat stations *A* and *B* receive a distress call from a boat.
The boat is within 6 kilometres of station *A*.
The boat is within 8 kilometres of station *B*.

Shade the possible area in which the boat could be.

Scale: 1 cm represents 1 km

(2 marks)

LEAVE MARGIN BLANK

9 (a) Work out $17\frac{1}{2}\%$ of 84 kg.

.....

.....

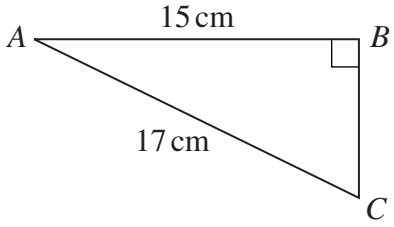
Answer .....kg *(2 marks)*

(b) Write down 1.75% of 840 km.

.....

Answer .....km *(1 mark)*

10 *ABC* is a right-angled triangle.
AB = 15 cm and *AC* = 17 cm



Not drawn accurately

Calculate the length of the side *BC*.

.....

.....

.....

.....

.....

Answer ..... cm *(3 marks)*

10

LEAVE MARGIN BLANK

11 (a) Solve the inequality $3x - 5 \leqslant 5 - 2x$

.....

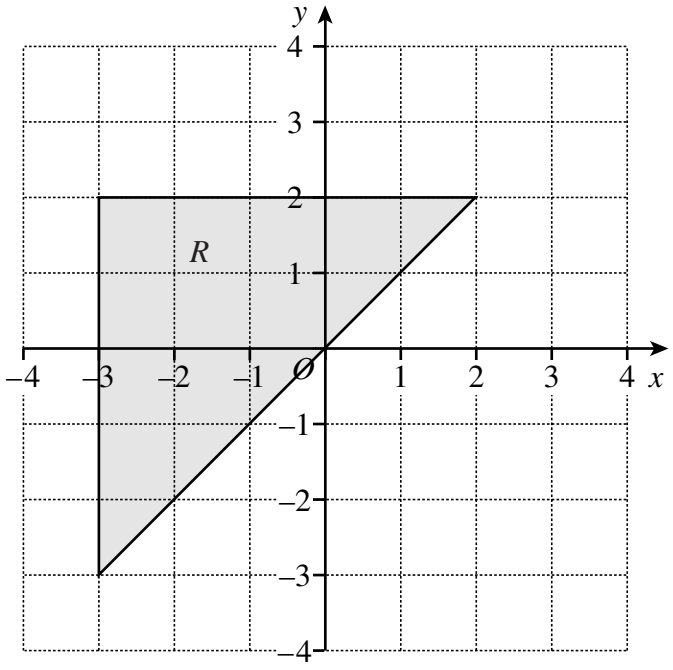
.....

.....

.....

Answer ..... *(2 marks)*

(b) The region R is shown shaded below.



Write down **three** inequalities which together describe the shaded region.

.....

.....

.....

Answer .....

.....

..... *(3 marks)*

12 Simplify $4x^2y^3 \times 2x^3y^4$

.....

.....

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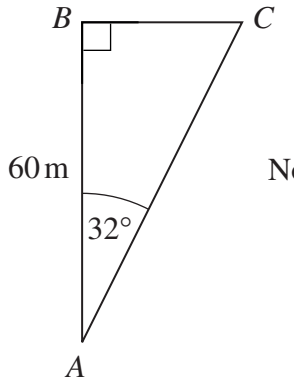
Answer ..... *(2 marks)*

13 ABC is a right-angled triangle.
$AB = 60\,\text{m}$
Angle $BAC = 32°$



Not drawn accurately

Find the length BC.

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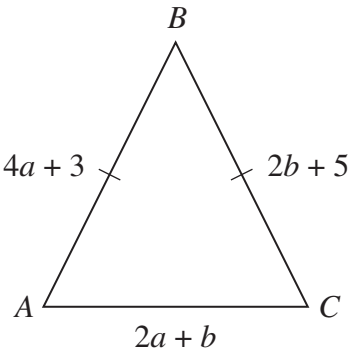
Answer ..... m *(3 marks)*

10

14 ABC is an isosceles triangle.
The lengths, in cm, of the sides are

$AB = 4a + 3$, $BC = 2b + 5$ and $AC = 2a + b$



Not drawn accurately

(a) $AB = BC$

Show that $2a - b = 1$

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(2 marks)

(b) The perimeter of the triangle is 32 cm.

Find the values of a and b.

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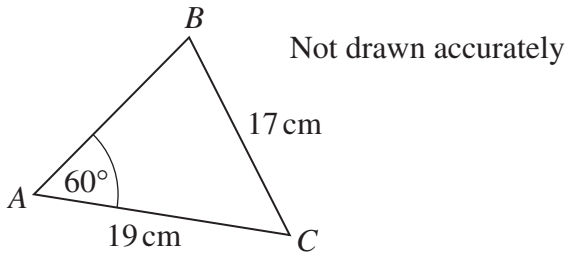
Answer $a =$ ..... cm $b =$ ..... cm *(4 marks)*

LEAVE MARGIN BLANK

15 (a) ABC is a triangle.
$AC = 19\,\text{cm}$, $BC = 17\,\text{cm}$ and angle $BAC = 60°$



Calculate the size of angle ABC.

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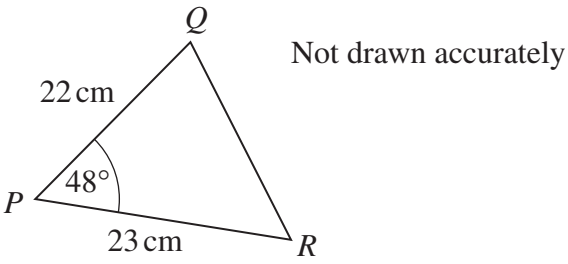
Answer ..... degrees *(3 marks)*

(b) PQR is a triangle.
$PR = 23\,\text{cm}$, $PQ = 22\,\text{cm}$ and angle $QPR = 48°$



Calculate the length of QR.
Give your answer to an appropriate degree of accuracy.

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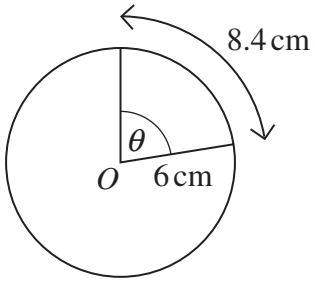
Answer ..... cm *(4 marks)*

13

16 A circle has a radius of 6 cm.
A sector has an arc length of 8.4 cm.
The angle at the centre of the sector is θ.



Not drawn accurately

Calculate the value of θ.

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Answer ..... degrees *(3 marks)*

LEAVE MARGIN BLANK

17 Simplify $\dfrac{3x^2 + x - 2}{9x^2 - 4}$

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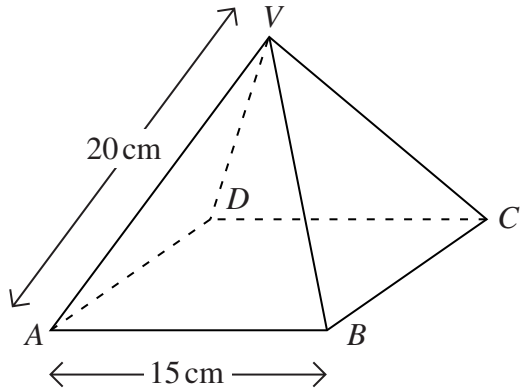
Answer ..... *(4 marks)*

Turn over for next question

7

LEAVE MARGIN BLANK

18 *VABCD* is a right pyramid on a square base.
V is vertically above the centre of the square.
VA = *VB* = *VC* = *VD* = 20 cm
AB = 15 cm



Not drawn accurately

Calculate the angle between the edge *VA* and the base *ABCD*.

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Answer ..... degrees *(5 marks)*

END OF QUESTIONS

5

SPECIMEN MARK SCHEME 2008

Module 5 Paper 2 Higher Tier

Q	Answers	Mark	Comments
1a	Line from (11:15,12) to (13:00,12)	B1	± 1mm
	'Line' from (13:00,12) to (13:45,0)	B1ft	ft their (13:00,12) ± 1mm
1b	'Their 12' ÷ 'Their 45mins'	M1	oe 12 ÷ 0:45, 1200 ÷ 45 etc Allow ft from the 'distance' and 'time' on their graph
	16	A1ft	ft if M1 awarded rounded ⩾ 3sf.
2a	n–1, n+1, n+7	B2	–1 each error or omission Note n–8, n + 8 is one error.
2b	$8n$	B1	
	$8n$ – 7	B1	
3a	Any k which is a multiple of 4	B1	
3b	Even	B1	
4a	$x^2 - 7x$	B1	
4b	$4(x - 3)$	B1	
4c	$x(x - 5)$	B1	
5a	540 ÷ 5	M1	External angle 360 ÷ 5 (or 72 seen)
	108	A1	
5b	(180 – their 108) ÷ 2	M1	108 – 72 or 180 – 72 – 72
	36	A1	
6a	$4x = 5 + 7$	M1	
	3	A1	
6b	$5y + 11 = 3y + 21$	M1	$5y \div 3 + 11 \div 3 = y + 7$, $1.6y + 3.6 = y + 7$ $1.7y + 3.7 = y + 7$ allow 1 error on 1st or 2nd line
	$5y - 3y = 21 - 11$	M1 dep	$\frac{5}{3}\ y = 7 - \frac{11}{3}$
	5	A1	

Q	Answers	Mark	Comments
7	$0.5 \times (12.4 + 19.3) \times 9.2$	M2	M1 splitting into rectangle and a triangle M1 rectangle 9.2×12.4, triangle 6.9×9.2
	145.82, 145.8, 146	A1	
8a	line and arc any radius	B1	
	2nd arc same radius and 2nd line	B1	± 2° accuracy
8b	Both arcs intersecting correct radius and region shaded or indicated	B2	B1 for either arc, correct radius ± 2mm
9a	$17.5 \div 100 \times 84$	M1	or clear attempt to work out 10% + 5% + 2.5%
	14.7 (kg)	A1	
9b	14.7 (km)	B1	
10	$17^2 - 15^2$ (= 64)	M1	or $x^2 + 15^2 = 17^2$
	$\sqrt{64}$	M1 dep	For squaring, subtracting and indication of square rooting
	8	A1	
11a	$5x \leqslant 10$	M1	Allow $5x < 10$ for M1, and $5x = 10$ only if inequality recovered
	$x \leqslant 2$		SC1 $x < 2$
11b	$y \leqslant 2$	B1	Accept $-3 \leqslant y \leqslant 2$, $<$ for $\leqslant$
	$x \geqslant -3$	B1	Accept $-3 \leqslant x \leqslant 2$, $<$ for $\leqslant$
	$y \geqslant x$	B1	oe Accept $y > x$ Note penalise poor notation first time only
12	$8x^5y^7$	B2	–1 each error or omission
13	Sight of tan	M1	Note alternative methods such as sine rule must be used correctly for M1 and must be complete. If for example hypotenuse is found Pythagoras or correct trig must be used.
	(BC =) 60 tan 32	A1	
	BC = 37.5, 37.49 …	M1	

Q	Answers	Mark	Comments
14a	$4a + 3 = 2b + 5$	M1	
	$4a - 2b = 2$ (÷2)	A1	Must indicate division by 2
14b	$4a+3+2b+5+2a+b=32$ $6a + 3b = 24$ $2a - b = 1$	B1	B1 for any version
	(1)×3: $6a - 3b = 3$ 12a = 27	M1	For attempt to eliminate
	$a = 2.25$	A1	
	$b = 3.5$	A1	
15a	$\frac{\sin B}{19} = \frac{\sin 60}{17}$	M1	Accept $\frac{19}{\sin B} = \frac{17}{\sin 60}$
	sin B = 0.9679(1…)	A1	
	B = 75.4(…)	A1	
15b	$x^2 = 22^2+23^2 - 2\times22\times23\times\cos 48$	M1	
	$x^2 = 335.8$ (…)	A1	
	$x = 18.32$(…)	A1ft	ft only if an error made in calculation of ×2 but not on $(22^2+23^2 - 2\times22\times23$ (=1))cos 48 (= $\sqrt{0.669} = 0.818$)
	18 or 18.3	B1ft	Independent mark. Award if value > 3sf seen or calculation seen.
16	$\frac{\theta}{360} \times 2\pi \times 6 = 8.4$	M1	
	$\theta = \frac{8.4 \times 360}{2\pi \times 6}$	A1	
	80.2(1…)	A1	
17	$(3x \pm a)(x \pm b)$	M1	$ab = \pm 2$
	$(3x - 2)(x + 1)$	A1	
	$(3x + 2)(3x - 2)$	B1	
	$\frac{x+1}{3x+2}$	A1	ft if M1 awarded, but only if a valid factor cancelled Further work such as cancelling x's do not award last mark
18	Identifying VAC	B1	Can be implied by working
	$AC^2 = 15^2 + 15^2$	M1	oe
	$\frac{1}{2}$ AC = 10.6(066…)	A1	$\sqrt{450} \div 2$ is A1, $\sqrt{450}$ is A1 if used in cos rule on VAC
	VAC = $\cos^{-1}$ (their $\frac{1}{2}$AC ÷ 20)	M1	
	VAC = 57.97 … ° or 58°	A1	