FOR OFFICIAL USE

X100/101

Total mark

NATIONAL QUALIFICATIONS 2008

TUESDAY, 20 MAY
1.00 PM – 1.35 PM

MATHEMATICS
INTERMEDIATE 1
Units 1, 2 and 3
Paper 1
(Non-calculator)

Fill in these boxes and read what is printed below.

Full name of centre

Town

Forename(s)

Surname

Date of birth

Day		Month		Year	

Scottish candidate number

Number of seat

1 **You may <u>NOT</u> use a calculator.**

2 Write your working and answers in the spaces provided. Additional space is provided at the end of this question-answer book for use if required. If you use this space, write clearly the number of the question involved.

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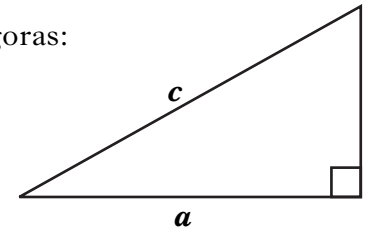
Use blue or black ink. Pencil may be used for graphs and diagrams only.

FORMULAE LIST

Circumference of a circle: $C = \pi d$

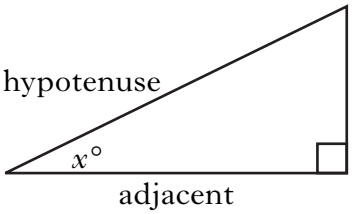
Area of a circle: $A = \pi r^2$

Theorem of Pythagoras:



$a^2 + b^2 = c^2$

Trigonometric ratios in a right angled triangle:



$$\tan x^\circ = \frac{\text{opposite}}{\text{adjacent}}$$

$$\sin x^\circ = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\cos x^\circ = \frac{\text{adjacent}}{\text{hypotenuse}}$$

DO NOT WRITE IN THIS MARGIN

Marks

ALL questions should be attempted.

1. (*a*) Find 2·685 – 0·29.

1

(*b*) Find 14 × 3000.

1

(*c*) Find 5·45 ÷ 5.

1

2. Sandra works night shift. One night she started work at 2235 and finished at 0715 the next morning.

How long did Sandra's shift last?

1

[Turn over

Marks

3. The diameter of a red blood cell is $6{\cdot}5 \times 10^{-3}$ millimetres.
Write this number in full.

2

4. A plumber charges £20 for being called out to a job, plus £12 **for each 15 minutes** he takes to do the job.
How much does he charge for a job which takes 2 hours?

2

Marks

5. A building company employs 70 staff.

The number of staff absences during the last year is shown in the frequency table below.

Number of Absences (Days)	Frequency
0	7
1	21
2	18
3	11
4	8
5	5
Total	70

(*a*) Find the probability of choosing a member of staff who had no absences.

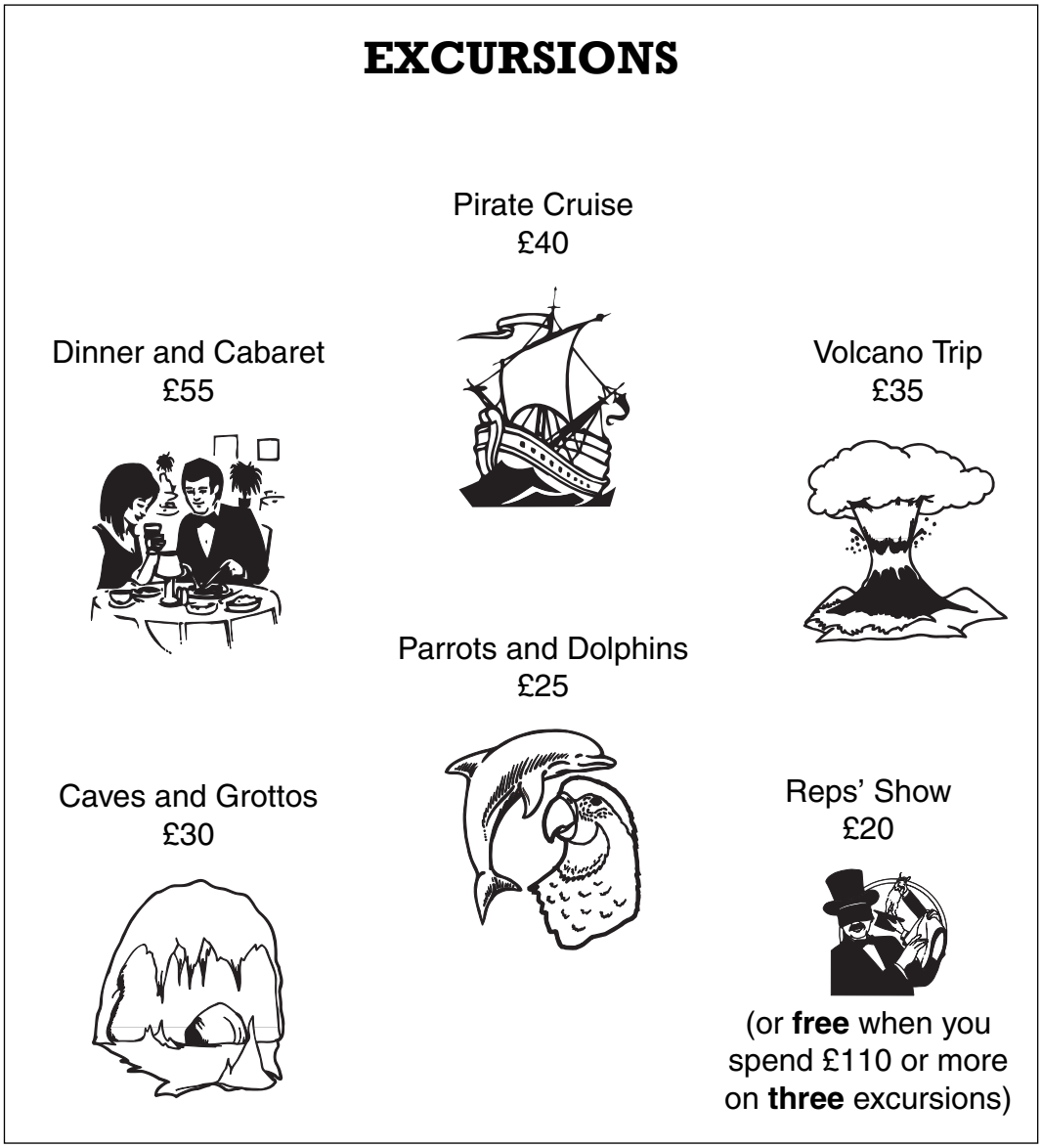
1

(*b*) Complete the table below **and** calculate the mean number of absences.

Number of Absences (Days)	Frequency	Number of Absences × Frequency
0	7	0
1	21	21
2	18	36
3	11	
4	8	
5	5	
Total	70	

3

6. Frances is on holiday. She wants to book some of the excursions shown in the advert below.



- Frances wants to book **four** different excursions.
- She can afford to spend a **maximum of £120**.
- She gets a **free** ticket for the Reps' Show when she spends £110 or more on **three** excursions.

Marks

6. (continued)

Two combinations of **four** excursions that Frances can afford are shown in the table below.

Dinner and Cabaret £55	55						
Pirate Cruise £40		40					
Volcano Trip £35		35					
Caves and Grottos £30	30						
Parrots and Dolphins £25	25	25					
Reps' Show £20 or Free	Free	20					
Total Price	£110	£120					

Complete the table to show **all** possible combinations that Frances can afford.

3

7. Solve algebraically the equation

$$7\,m - 8 = 40 + m.$$

3

[Turn over

Marks

8. (*a*) Complete the table below for $y = 2{\cdot}5x - 3$.

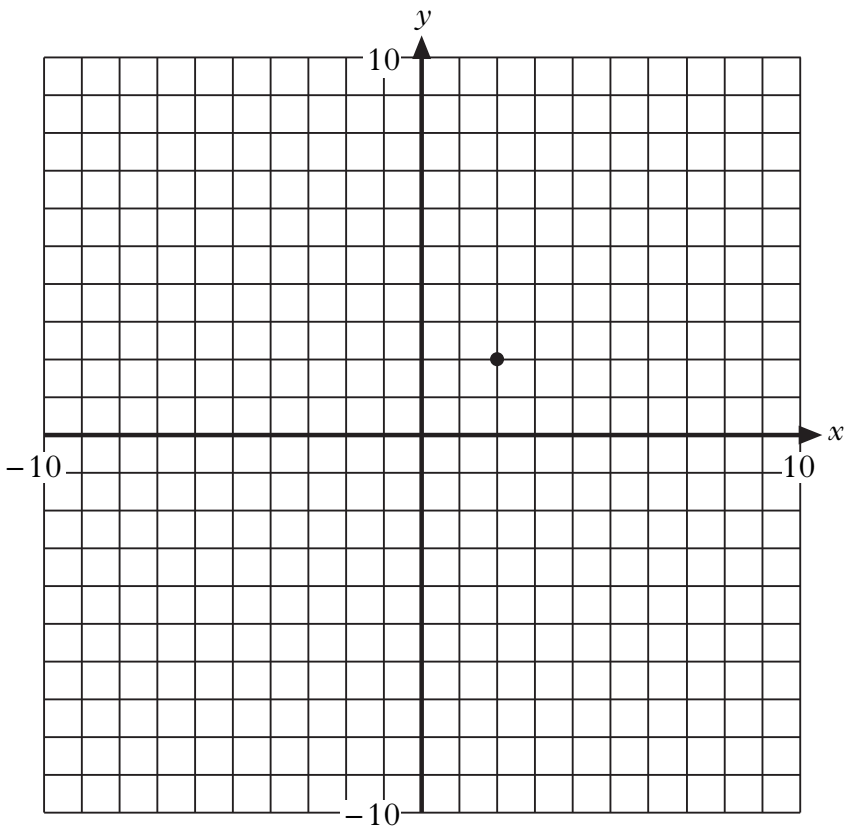
x	-2	0	2	4
y			2	

2

(*b*) Draw these **two** lines on the grid:

(i) $y = 2{\cdot}5x - 3$;

(ii) $y = 3$. **3**



Marks

9. Evaluate $x^2 - y$ when $x = -8$ and $y = 73$.

3

10. Jamie invests £1440 in a savings account.
The rate of interest is 5% per annum.
Calculate the interest he should receive after 3 months.

4

[*END OF QUESTION PAPER*]

DO NOT WRITE IN THIS MARGIN

ADDITIONAL SPACE FOR ANSWERS

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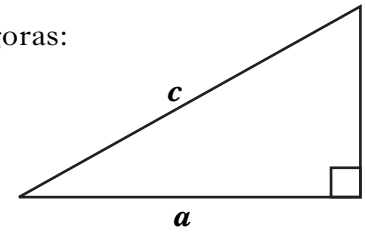

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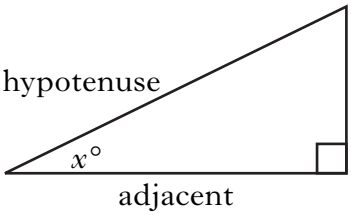

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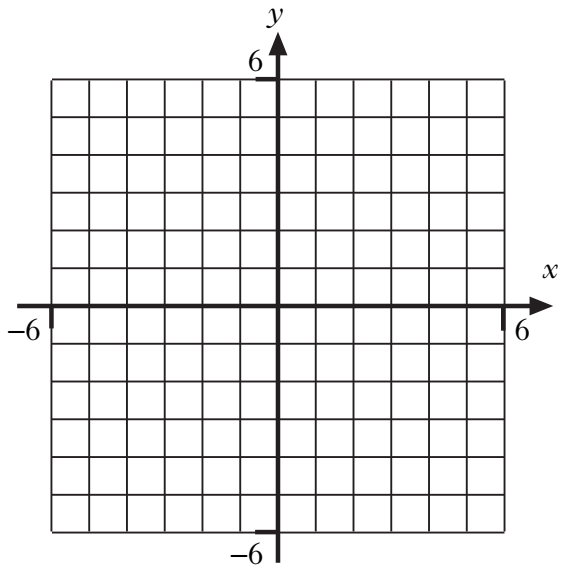
Marks

1. (*a*) On the grid below plot the points A(–2,4), B(–4,–1) and C(1,–3).



2

(*b*) Plot the point D so that shape ABCD is a square. **1**

[Turn over

Marks

2. The table below shows the basic annual premiums charged for car insurance by an insurance company.

The basic premium depends on the area where the driver lives and the group their car belongs to.

	BASIC ANNUAL PREMIUM				
AREA	**CAR GROUP**				
	1	**2**	**3**	**4**	**5**
A	£428	£517	£613	£725	£838
B	£497	£555	£659	£779	£898
C	£525	£598	£712	£841	£975
D	£540	£651	£775	£915	£1055

(*a*) Lynn's car is in group 4 and she lives in area C.
Write down her basic annual premium.

1

Drivers who do not make a claim on their insurance receive a discount on their basic annual premium as shown in the table below.

Number of years without a claim	1	2	3	4 or more
Discount	30%	40%	55%	67%

(*b*) Lynn has not made a claim for 4 years.
How much will it cost her to insure her car?

2

DO NOT WRITE IN THIS MARGIN

Marks

3. (*a*) Multiply out the brackets and simplify

$$4(5u - 2) + 15.$$

2

(*b*) Factorise $9c + 24$.

2

[Turn over

Marks

4. A grass lawn is treated with weedkiller.

The lawn is split into twenty squares each of the same area.

Ten of the squares are treated with Weedclear.

Three weeks later the number of weeds in each of these squares is as follows:

3, 4, 6, 2, 1, 7, 2, 1, 1, 3.

(*a*) Find the median.

2

(*b*) Find the range.

1

The other ten squares are treated with Noweed.

For these squares the median is 2 and the range is 10.

(*c*) Make **two** comments comparing the number of weeds in squares treated with Weedclear and Noweed.

2

DO NOT WRITE IN THIS MARGIN

Marks

5. Ross drove 190 miles from Preston to Edinburgh in 3 hours 30 minutes.

During the first part of his journey he drove for 2 hours at an average speed of 68 miles per hour.

Find the average speed in miles per hour for the rest of his journey.

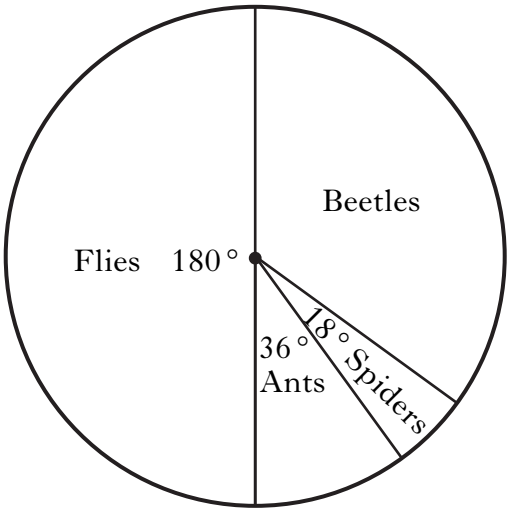
4

[Turn over

Marks

6. Some biology students were doing a project on "creepy crawlies". The pie chart shows the different types of creepy crawlies that the students collected from a garden.

CREEPY CRAWLIES

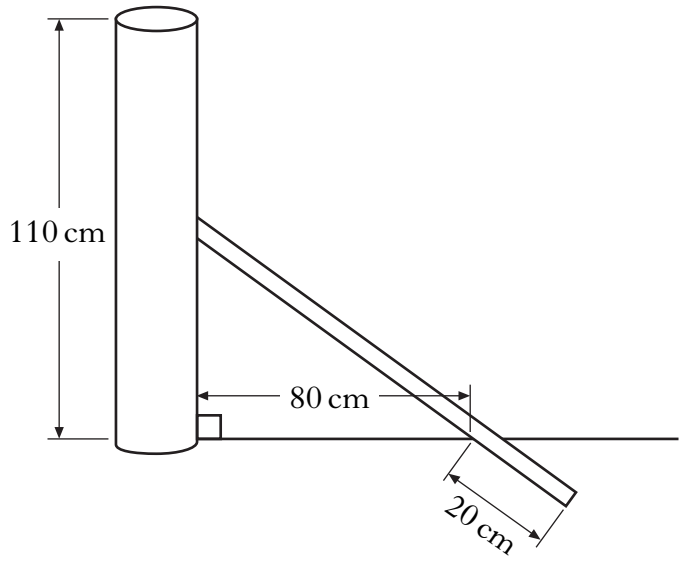


The students collected 220 creepy crawlies altogether.
How many of them were beetles?

3

Marks

7. A farmer is building a wire fence around a field.
The fence has heavy posts at the corners.
Each corner post is supported by a stake as shown in the diagram.



- The corner post is 110 centimetres high.
- The stake meets the corner post halfway up.
- The stake meets the ground 80 centimetres from the foot of the corner post.
- 20 centimetres of the stake is below ground level.

Calculate the length of the stake.
Do not use a scale drawing.

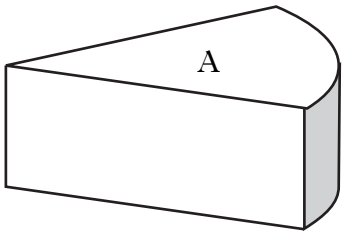
4

[Turn over

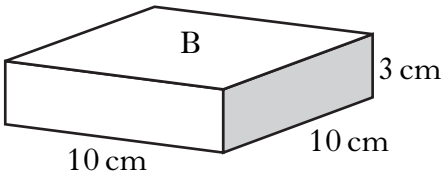
Marks

8. Shown below are two pieces of cheese.
The weight of each piece is proportional to its volume.

Piece A has a volume of 400 cubic centimetres.
It weighs 480 grams.



Piece B is a cuboid.



Find the weight of piece B.

4

Marks

9. The table shows the ticket prices for a theme park in France.
The prices are given in euros.

Ticket		Adult price	Child price
Bronze	(valid 1 day)	€50	€40
Silver	(valid 2 days)	€90	€75
Gold	(valid 3 days)	€110	€85

Gavin buys silver tickets for two adults and one child.
Find the total cost, in pounds and pence, of buying these tickets if the exchange rate is £1 = 1·39 euros.

3

[Turn over

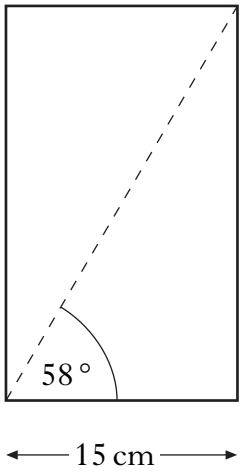
Marks

10. Solve algebraically the inequality

$$\tfrac{1}{2}y + 3 > 13.$$

2

11. Calculate the area of the rectangle shown below.
Do not use a scale drawing.



4

Marks

12. Use the formula below to find the value of T when $r = 2{\cdot}6$ and $s = 1{\cdot}4$.

$$T = \frac{rs}{r+s}$$

3

[Turn over

Marks

13. Sergei has been training to run a marathon.

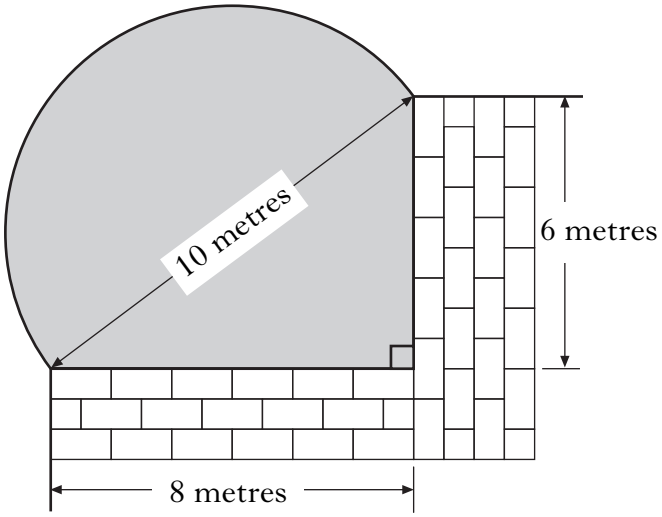
Since he started training his weight has dropped from 80 kilograms to 74 kilograms.

Express his weight loss as a percentage of his original weight.

4

Marks

14. The diagram below shows part of a garden which is being watered from a sprinkler.



The area being watered is in the shape of a semi-circle and a right angled triangle.

Calculate the area being watered.

4

[*END OF QUESTION PAPER*]

DO NOT WRITE IN THIS MARGIN

ADDITIONAL SPACE FOR ANSWERS