

FOR OFFICIAL USE

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Total
marks

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X056/101

NATIONAL
QUALIFICATIONS
2000

THURSDAY, 25 MAY
9.00 AM - 9.35 AM

**MATHEMATICS
INTERMEDIATE 1
Paper 1
(Non-calculator)**

Fill in these boxes and read what is printed below.

Full name of centre

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Town

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Forename(s)

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Surname

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Date of birth

Day Month Year

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Scottish candidate number

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Number of seat

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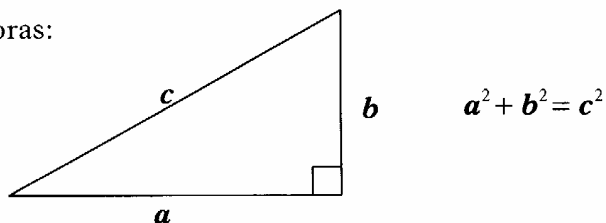
- 1 You may NOT use a calculator.**
- 2 There are three Sections in this paper.**
 - Section A assesses the compulsory units Mathematics 1 and 2.
 - Section B assesses the optional unit Mathematics 3.
 - Section C assesses the optional unit Applications of Mathematics.

Candidates must attempt **all** questions in Section A (Mathematics 1 and 2) **and either** Section B (Mathematics 3) **or** Section C (Applications of Mathematics).
- 3 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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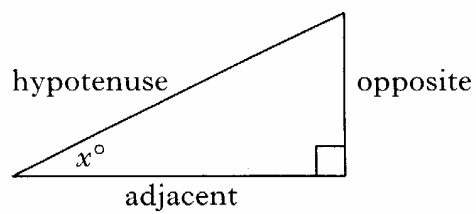
FORMULAE LIST

Circumference of a circle: $C = \pi d$
Area of a circle: $A = \pi r^2$
Curved surface area of a cylinder: $A = 2\pi rh$

Theorem of Pythagoras:



Trigonometric ratios
in a right angled
triangle:



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

Marks

SECTION A (Mathematics 1 and 2)

ALL candidates should attempt this Section.

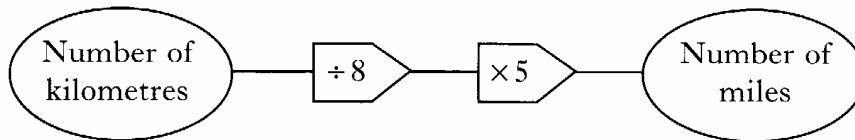
A1. (a) Find 25% of £300.

1

(b) Find $\frac{2}{3}$ of £6.99.

1

A2. The Anderson family use this rule to convert distances from kilometres to miles.



They are travelling to Bordeaux when they pass this road sign.



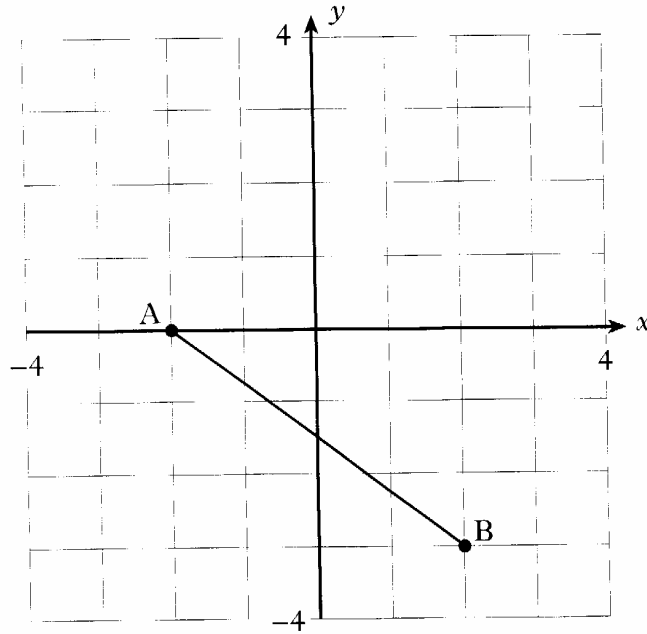
How many **miles** have they to travel to Bordeaux?

2

[Turn over

A3. (a) Write down the coordinates of the points A and B marked on this diagram.

Marks



(b) Calculate the length of the line joining A to B.
Do not measure with a ruler.
You must show your working.

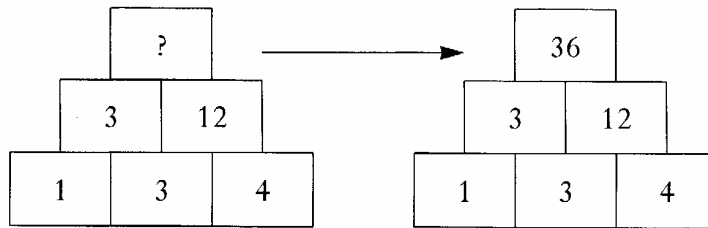
2

4

Marks

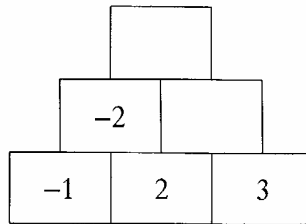
A4. Rule: The number in a box is always equal to the two numbers in the boxes below it multiplied together.

Example



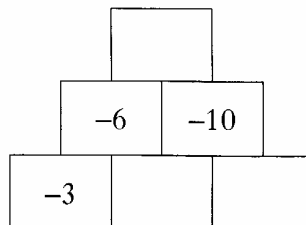
Use the rule to complete the diagrams below.

(a)



2

(b)



3

[Turn over

Marks

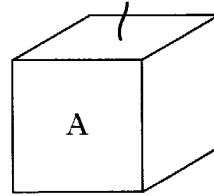
A5. The diagram below shows two candles.

Each candle is in the shape of a cube.

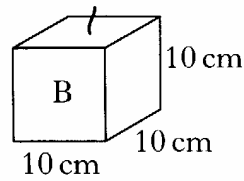
The length of time that each candle will burn is proportional to its volume.

Candle A has a volume of 1500 cm^3 .

It will burn for 30 hours.



For how long will candle B burn?



4

[END OF SECTION A]

Candidates should now attempt

EITHER Section B (Mathematics 3) on *Pages seven and eight*

OR Section C (Applications of Mathematics) on *Pages nine to twelve.*

Marks

SECTION B (Mathematics 3)**ONLY candidates doing the course Mathematics 1, 2 and 3
should attempt this Section.****B6.** (a) Solve algebraically the equation

$$5x + 1 = x + 7.$$

3

(b) Solve algebraically the inequality

$$6y - 1 < 11.$$

2

B7. Factorise

$$3x - 12.$$

2

[Turn over

Marks

B8. Multiply out the brackets and simplify

$$7(2a + 1) - 3a.$$

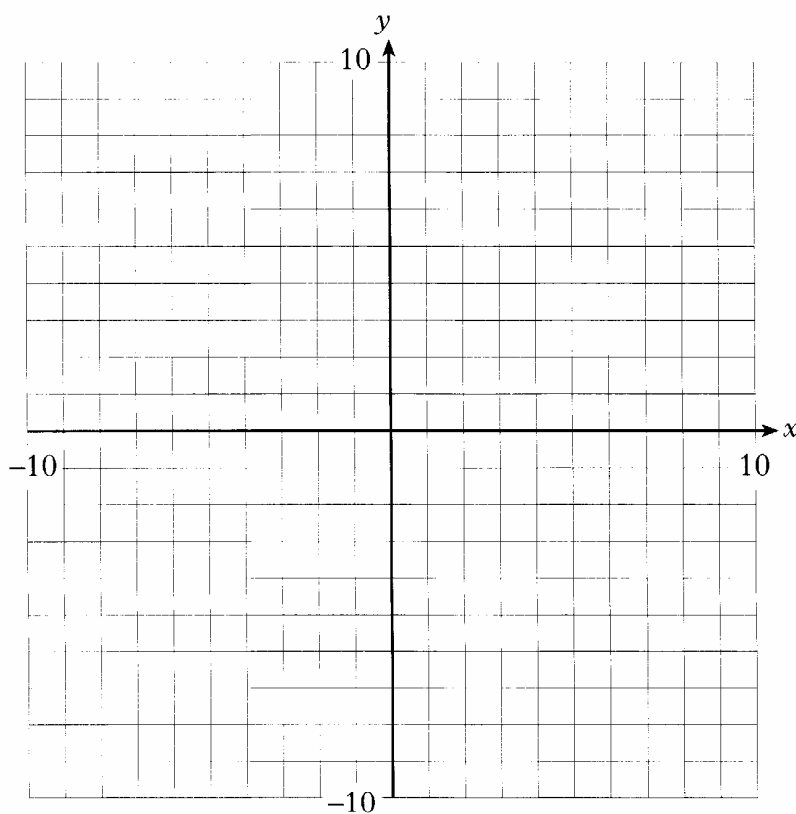
2

B9. (a) Complete the table below for $y = 3x - 2$.

x	-2	0	3
y			

2

(b) Using the table in part (a), draw the graph of $y = 3x - 2$ on the grid.



2

[END OF SECTION B]

Marks

SECTION C (Applications of Mathematics)

ONLY candidates doing the course Mathematics 1, 2 and Applications of Mathematics should attempt this Section.

C6. A shop uses a spreadsheet to work out the value of the stock.

	A	B	C	D
1	Item	Number	Price of	Total value
2		in stock	item in £	in £
3	Chocolate bars	23	0.24	5.52
4	Crisps	61	0.25	15.25
5	Cartons of orange juice	19	0.30	5.70
6	Apples	5	0.21	1.05
7	Small bottles of cola	41	0.28	11.48
8	Bananas	8	0.18	
9				
10		Total value of stock		
11				

- (a) The owner wants to work out the total value of the bananas.
What formula does she use in cell D8 to find this?

1

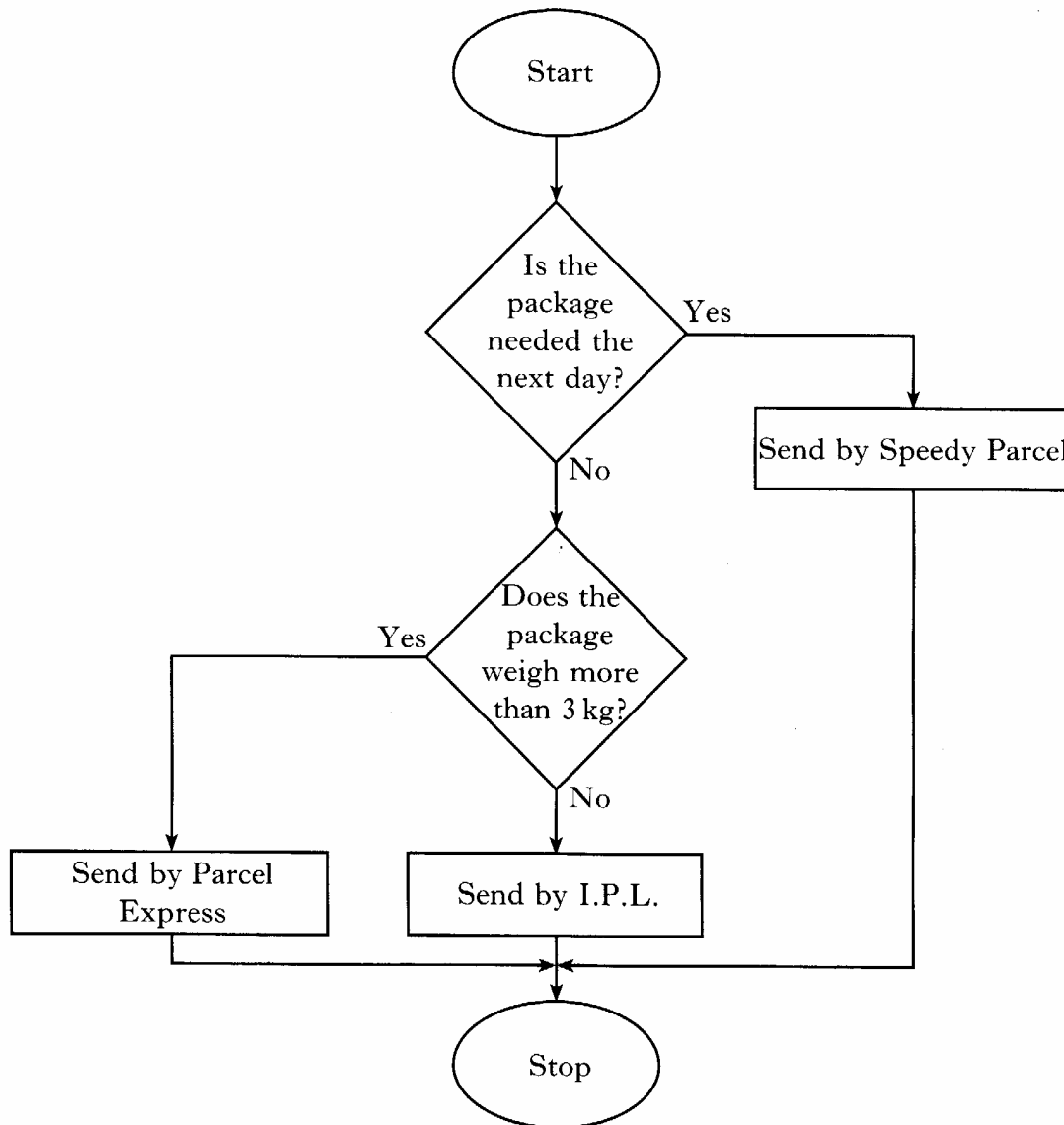
- (b) What formula would she put into cell D10 to work out the total value of all of the stock?

1

[Turn over

Marks

- C7. A computer supply company uses a flowchart to decide how to deliver packages to their customers.



They are going to send a package weighing 3.8 kg which is not needed the next day. Which delivery service do they choose?

Explain your answer.

Marks

- C8.** Army cadets set off on a training exercise from a camp at C.
- They walk for 8 kilometres on a bearing of 048° from position C until they reach a bridge at B.
- At the bridge they change direction and walk for a further 5 kilometres on a bearing of 142° from B, arriving at D.
- (a) Make a scale drawing of this walk.



3

- (b) Use your scale drawing to find the direct distance from C to D.

2

[Turn over for Question C9 on *Page twelve*

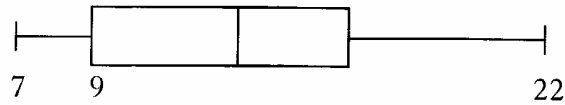
Marks

- C9.** A group of students sat a Mathematics test.
The marks scored in the test are shown below.

8 8 9 10 14 11 15 7 16 19 22 11 16 17 18

- (a) Find the median mark.

- (b) Complete the boxplot, drawn below, to show the marks scored by the students in the Mathematics test.



[END OF SECTION C]

[END OF QUESTION PAPER]

2

2

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Total
mark

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X056/102

NATIONAL
QUALIFICATIONS
2001

THURSDAY, 17 MAY
9.00 AM – 9.35 AM

MATHEMATICS
INTERMEDIATE 1
Units 1, 2 and
Applications of Mathematics
Paper 1
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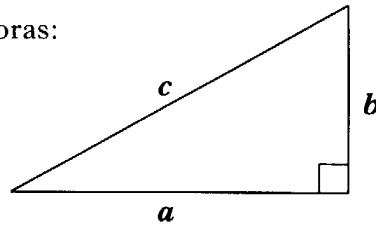
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FORMULAE LIST

Circumference of a circle: $C = \pi d$
Area of a circle: $A = \pi r^2$
Curved surface area of a cylinder: $A = 2\pi r h$

Theorem of Pythagoras:



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

ALL questions should be attempted.

Marks

1. (a) Find 7.35×8 .

1

(b) Find $\frac{3}{4}$ of £82.

1

2. Part of the timetable of the overnight bus from Stirling to London is shown opposite.

Stirling (depart)	2140
London (arrive)	0615

How long does the journey from Stirling to London take?

1

[Turn over

Marks

3. Eight jars of jam can be made from 2 kilograms of raspberries.
How many jars of jam can be made from 5 kilograms of raspberries?

2

4. Jenna is buying a car. The cash price is £11 500. It can be bought on hire purchase by paying a deposit of 20% of the cash price and 36 instalments of £300.

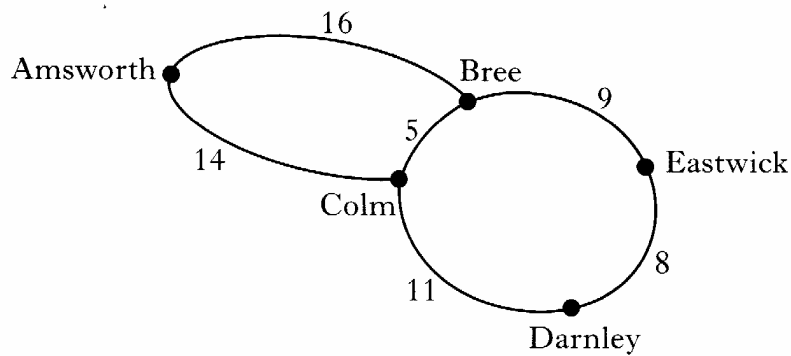


Find the total hire purchase price of the car.

3

Marks

5. This network diagram shows the distances (in miles) between five towns.



One route which starts at Amsworth and passes through the other four towns **once** is

Amsworth → Bree → Eastwick → Darnley → Colm

$$\text{Distance} = 16 + 9 + 8 + 11 = 44 \text{ miles}$$

Write down all other possible routes which start at Amsworth and pass through the other four towns once.

Find the shortest route.

3

[Turn over]

Marks

6. (a) This spreadsheet is used to record students' marks.

	A	B	C	D	E
1		Test 1	Test 2	Test 3	Total mark
2	James	43	57	61	161
3	Ann	81	56	74	211
4	Sarah	71	65	88	224
5	William	29	35	59	123
6	Ian	63	66	75	204
7	Mhairi	75	76	64	215
8					
9					

The formula =SUM(B4..D4) was used in this spreadsheet.

In which cell was this formula used?

1

- (b) Another spreadsheet looks like this.

	A	B	C	D	E	F
1		Test 1	Test 2	Test 3	Test 4	Average mark
2	Sadik	56	63	67	57	
3	Ronald	64	68	69	59	65.0
4	Gail	71	59	72	64	66.5
5	Norma	69	71	58	66	66.0
6	Peter	74	62	69	71	69.0
7						
8						
9						

What formula is used in cell F2 to work out Sadik's average mark?

1

Marks

7. During a period of 30 days the temperature at a weather station is recorded each day.

The frequency table below shows these temperatures.

<i>Temperature (°C)</i>	<i>Frequency</i>	<i>Temperature × Frequency</i>
-3	1	
-2	2	
-1	4	
0	2	
+1	6	
+2	8	
+3	3	
+4	4	

- (a) Write down the modal temperature.

1

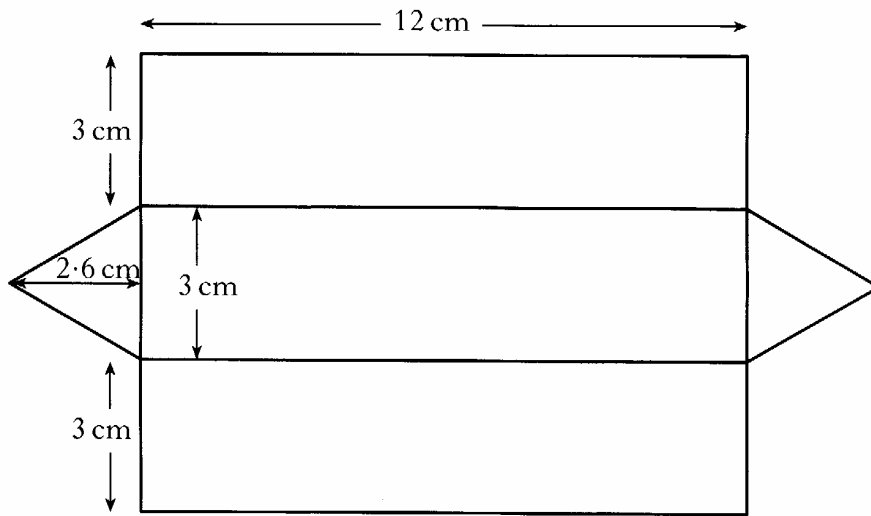
- (b) Complete the table above and find the mean temperature.
Give your answer as a decimal.

3

[Turn over

Marks

8. The diagram below shows the net of a triangular prism.



Find the total **surface area** of the shape.

4

Marks

9. The manager of the Central Hotel is buying new televisions for each of the hotel's 50 bedrooms. Two suppliers offer him the following deals.

ELECTRO

Televisions
£199.99 each

KOSTCUTS

Televisions
£210 each

* Get one free for
every ten you buy

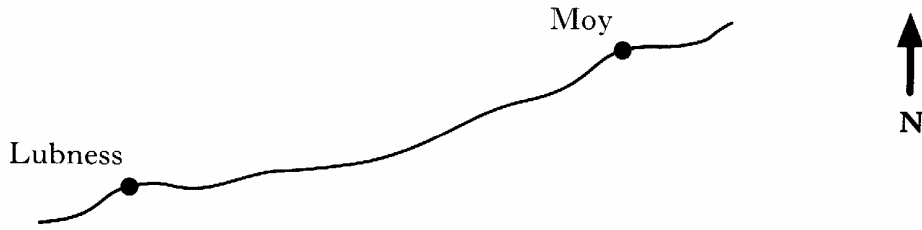
Which supplier offers the lower price for 50 televisions?

You must show your working.

4

[Turn over

10. The scale drawing shows the position of two ports, Lubness and Moy.



Scale: 1 cm to 20 km

(a) Use the scale drawing to find the distance in kilometres from Lubness to Moy.

(b) From Lubness a boat lies on a bearing of 120° .
From Moy its bearing is 200° .

Complete the scale drawing above to show the position of the boat.

Marks

2

3

Marks

11. (a) Find $7 - (-2)$.

1

(b) Find $-24 \div (-3)$.

1

[END OF QUESTION PAPER]

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marks

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2001

THURSDAY, 17 MAY
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MATHEMATICS
INTERMEDIATE 1
Units 1, 2 and
Applications of Mathematics
Paper 2

Fill in these boxes and read what is printed below.

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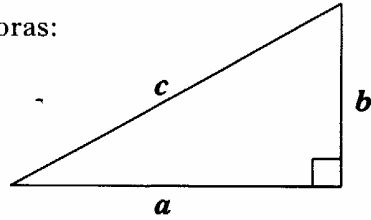
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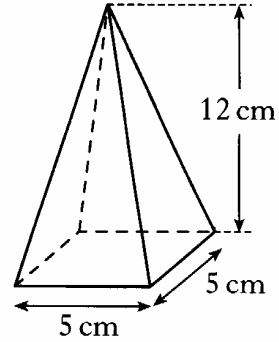
Marks

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1.

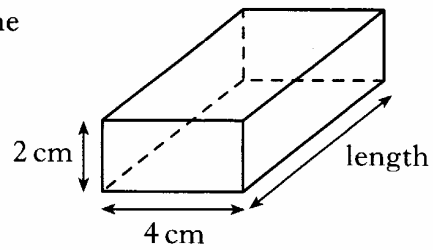
$$\text{Volume of pyramid} = \frac{1}{3} \text{ of (area of base} \times \text{height)}$$

- (a) Use the formula above to work out the volume of this square-based pyramid.



3

- (b) This cuboid has the same volume as the pyramid shown above.
Find the length of the cuboid.

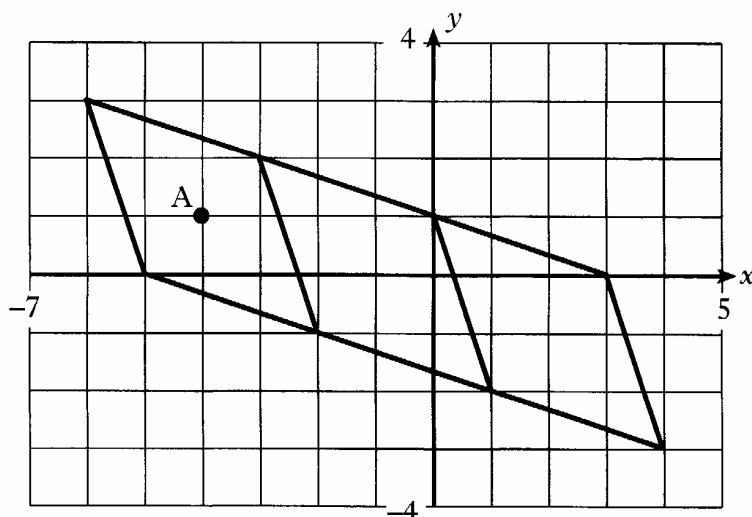


2

[Turn over

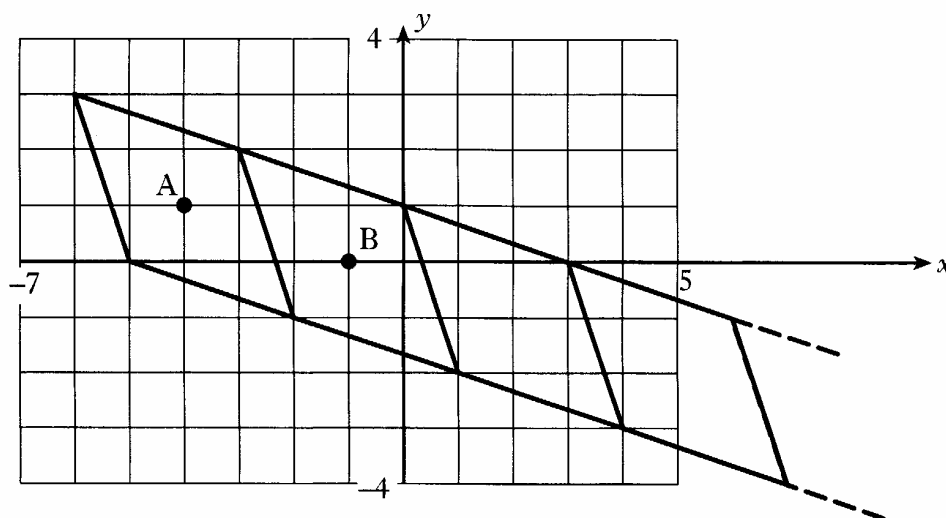
Marks

2. (a) Write down the coordinates of the point A marked on this diagram.



1

(b) The pattern of parallelograms continues.



A is the centre of the first parallelogram.

B is the centre of the second parallelogram.

Find the coordinates of the centre of the sixth parallelogram.

2

Marks

4. Laura works part-time in a petrol station.
She works Monday to Friday from 5.30 pm until 10.15 pm.
Her basic rate of pay is £3.60 per hour.

(a) Calculate her weekly wage.

3

- (b) Laura was paid time and a half for working one bank holiday weekend.
Her wage for the weekend was £64.80. How many hours did she work
that weekend?

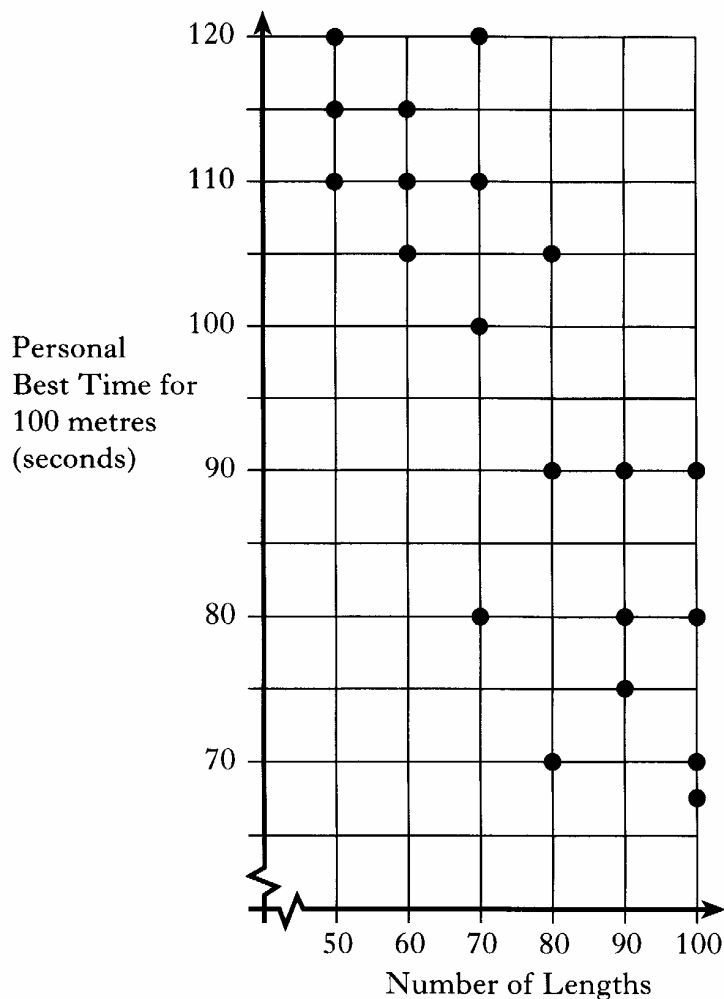
2

Marks

3. A group of swimmers record

- the number of lengths they swim in each training session
- their personal best time (in seconds) for swimming 100 metres in competition.

The scattergraph shows the results.



(a) Draw a line of best fit through the points on the graph.

1

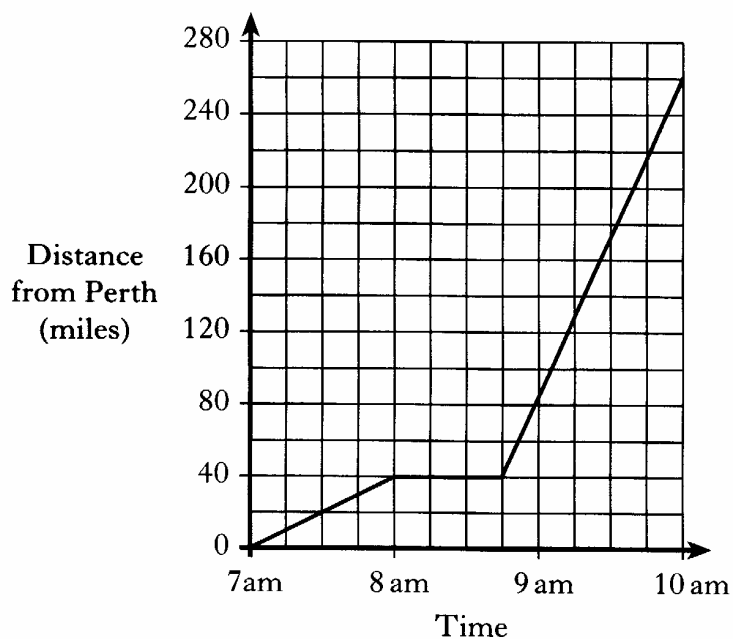
(b) Use the graph to estimate the personal best time of a swimmer who swims 75 lengths in each training session.

1

[Turn over

Marks

5. Andrea leaves home in Perth at 7 am and drives 40 miles to Edinburgh Airport where she then catches a flight to Dublin. Her journey is shown on the graph below.



- (a) How long does she spend waiting at Edinburgh Airport?

1

- (b) Calculate the average speed of her flight from Edinburgh to Dublin.

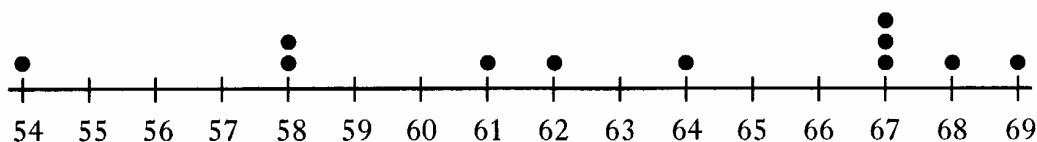
4

[Turn over

Marks

6. Walter is a double glazing salesman.
 Each month he earns £500 **plus** 5% commission on all his sales.
 Calculate the value of his sales in a month when his **total earnings** were £1900.

7. The weights (to the nearest kilogram) of the 11 players in a hockey team are shown on the scale below.



- (a) What percentage of the team weighs less than 60 kg?
 Give your answer correct to 1 decimal place.

- (b) Write down the median weight of the team.

- (c) If another player is added to the scale the new median is 65 kg. What is the weight of this player?
 Explain your answer.

3

4

1

2

Marks

8. The box office takings at cinemas in the UK and the USA from showing "The Spartans" are shown below.

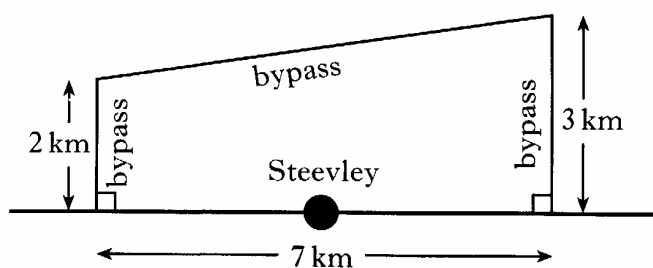
"THE SPARTANS"	
Box Office Takings	
UK	£10 230 000
USA	\$15 800 000

Exchange Rate: £1 = \$1.52

Change the box office takings in the USA to pounds sterling.
Give your answer to the nearest thousand pounds.

3

9. A bypass is being built to reduce the traffic passing through Steevley as shown in the diagram.



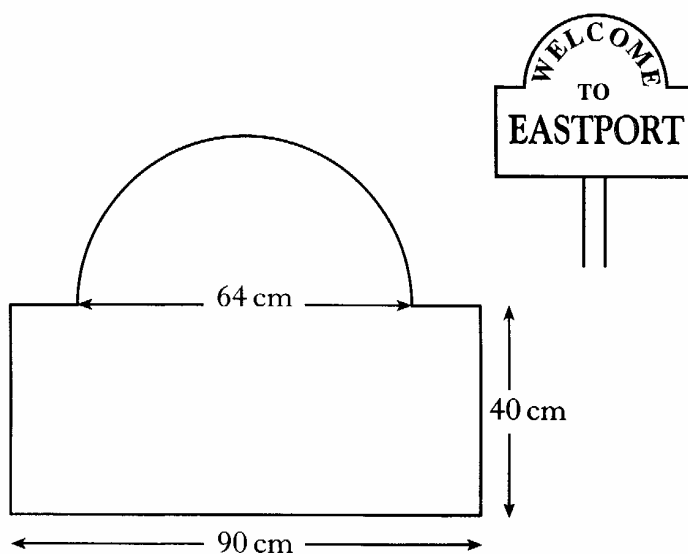
Calculate the total length of the bypass.

Do not use a scale drawing.

4

Marks

10. This sign is in the shape of a rectangle and a semi-circle.



Calculate the area of the sign.

Give your answer to the nearest square centimetre.

5

Marks

11. During a 12 day period in June, Frank records the amount of rainfall (in millimetres) each day.

The rainfall figures are shown below.

1, 8, 3, 9, 11, 8, 2, 4, 9, 11, 12, 7

Calculate the interquartile range of the rainfall figures.

4

[END OF QUESTION PAPER]