

Surname		Centre Number	Candidate Number
Other Names			0



GCSE

4370/04

**MATHEMATICS – LINEAR
PAPER 2
FOUNDATION TIER**

A.M. MONDAY, 17 June 2013

1 $\frac{3}{4}$ hours

C D E F G
58 45 33 21 9

ADDITIONAL MATERIALS

A calculator will be required for this paper.
A ruler, a protractor and a pair of compasses may be required.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen. Do not use gel pen or correction fluid.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer all the questions in the spaces provided.

If you run out of space, use the continuation page at the back of the booklet, taking care to number the question(s) correctly.

Take π as 3.14 or use the π button on your calculator.

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question 12.

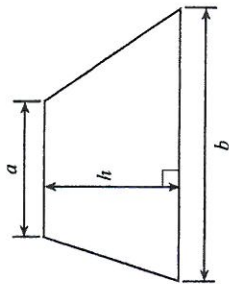


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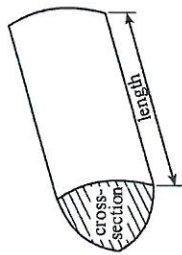
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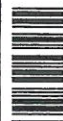
Formula List



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



$$\text{Volume of prism} = \text{area of cross-section} \times \text{length}$$



02

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(4370-04)

Examiner only

1. (a) Kevin orders some items from a butcher. Complete the four entries in the following table to show his bill for these items.

Amount	Item	Cost (£)
4.5kg	Beef @ £8.98 per kg	40.41
9 packs	Sausages @ £4.39 per pack	39.51
8 packs	Stuffing @ 38p per pack	3.04
12	Steaks @ £6.32 each	75.84
Total		158.80

[4]

- (b) He gets a 20% discount. How much is this discount?

$$0.20 \times 158.80 = £31.76$$

[2]

2. Circle the quantity that is the appropriate estimate for each of the following.

Length of a football pitch	120 km	120 m	120 mm	120 cm
Weight of a man	80 kg	80 g	80 mg	800 kg
Capacity of a cup	2 litres	10 cm ³	200 ml	1 ml
Area of a page in a book	4 m ²	400 cm ²	40 mm ²	400 cm ³

[4]



0 3

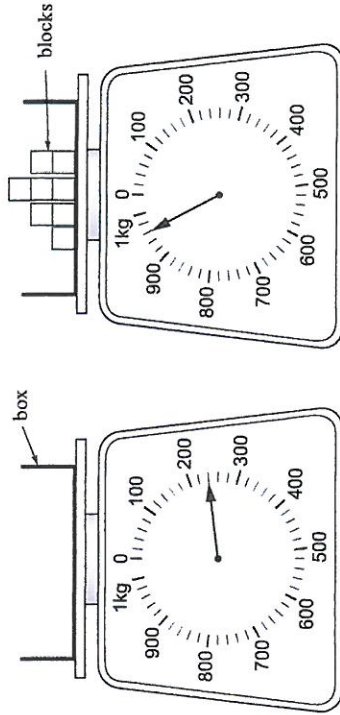
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(479-6-9)

Turn over.

Examiner only

3. A box is placed on a scale. 8 identical blocks are then placed in the box.



Find how much one block weighs.

$$100 \div 5 = 20g \text{ per dash on scale.}$$

$$8 \text{ blocks weigh } = 950 - 250 = 700g$$

$$1 \text{ block weighs } 700 \div 8 = 87.5g$$

[3]

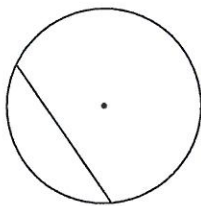


0 4

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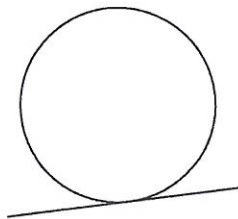
(479-6-4)

4. (a) Write down the special name of the straight line shown in each of the following diagrams.



Chord

B1



Tangent

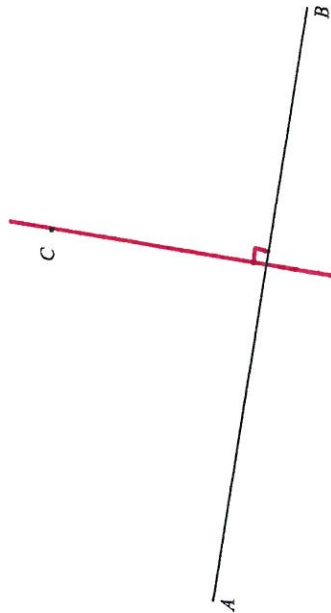
B1

[2]

- (b) (i) Measure, in centimetres, the length of the line AB in the diagram below.

Length of $AB = 7.9$ cm

[1]



B1

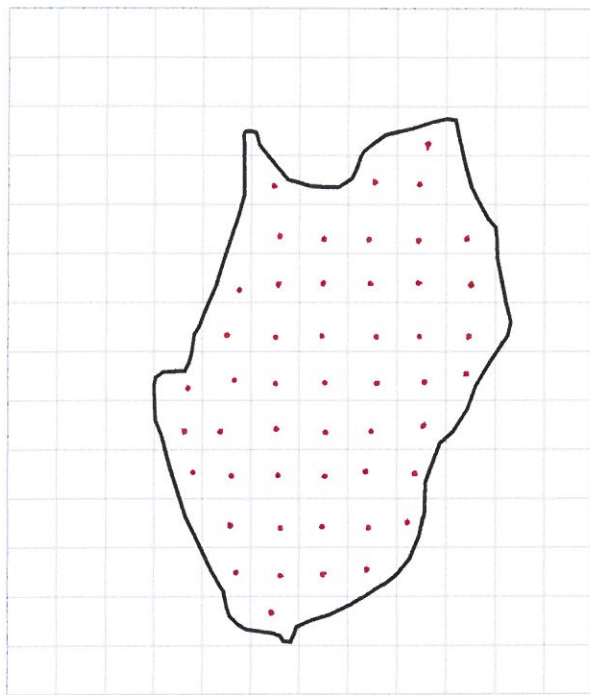
- (ii) Draw a line perpendicular to AB that passes through C .

[1]



0 5

5. (a)



The above shape is the outline of a pond in a park.
It is drawn on a square grid where each square represents 6 m^2 .
Estimate the area of the surface of the pond.

Can't square that are more than half covered by shape

$$50 \text{ squares} \times 6 = 300$$

Area of the surface of the pond = 300 m^2

[3]

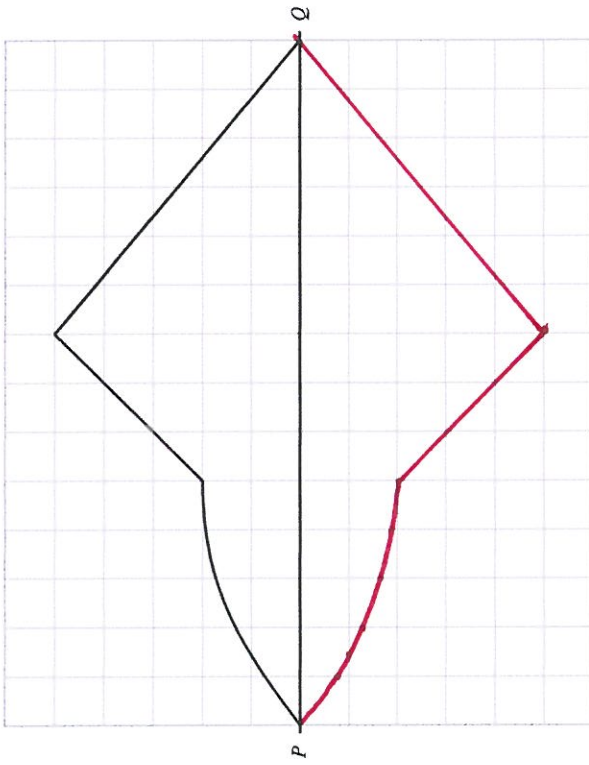


0 6

Examiner only

7

(b) Complete the following figure so that it is symmetrical about the line PQ .



[2]



0 7

(4370-04)

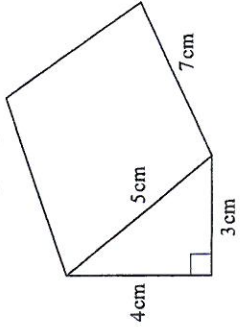
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Turn over.

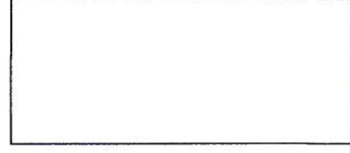
Examiner only

8

6. The diagram shows a sketch of a triangular prism.



Draw an accurate net of the triangular prism.
The 7 cm by 3 cm face has been drawn for you.



[4]

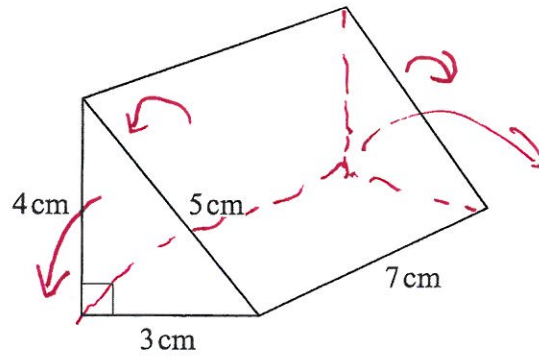


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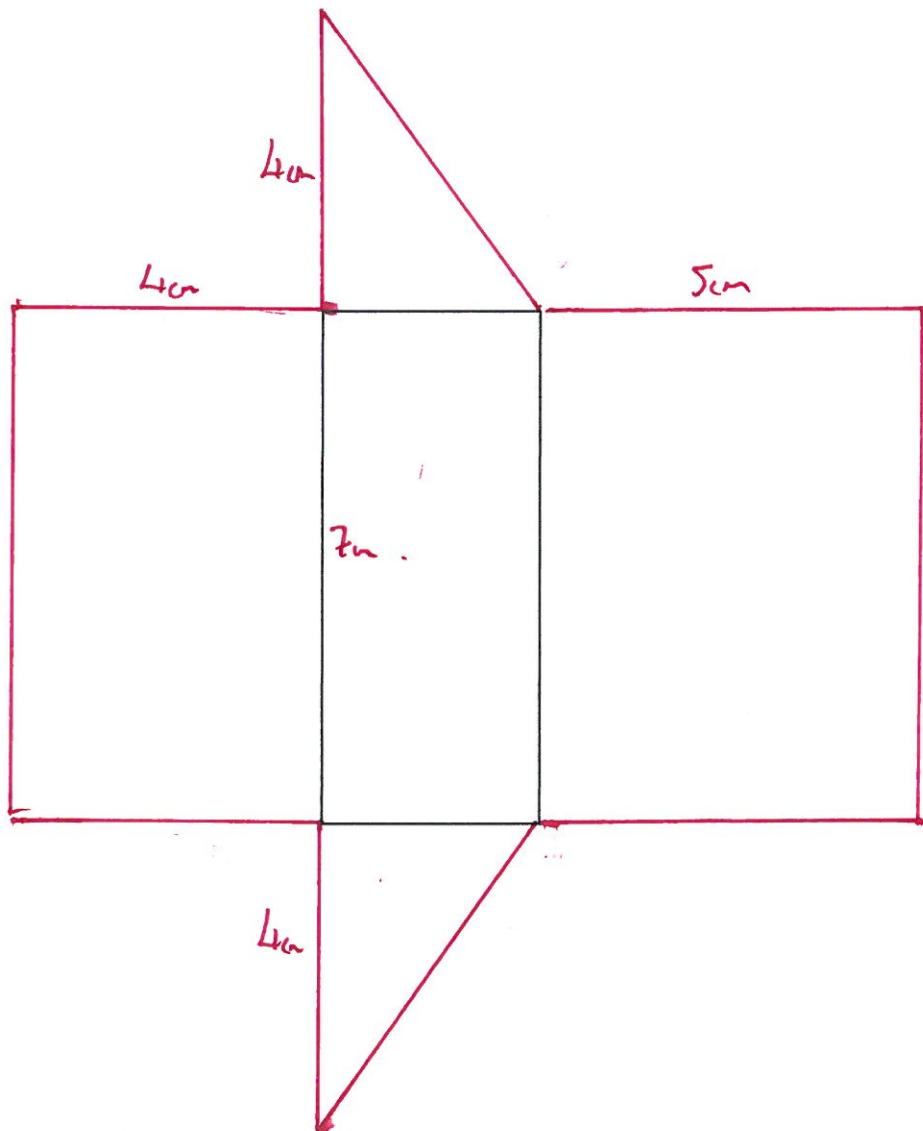
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(4370-04)

6. The diagram shows a sketch of a triangular prism.



Draw an **accurate** net of the triangular prism.
The 7 cm by 3 cm face has been drawn for you.



B1
B1
B1
B1

[4]



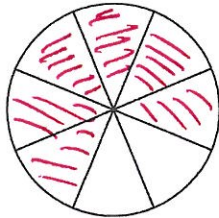
Examiner only

7. (a) Draw a circle around all of the following fractions that are equal to 0.6.

$\frac{12}{20}$ $\frac{1}{6}$ $\frac{9}{15}$ $\frac{6}{10}$ $\frac{5}{20}$

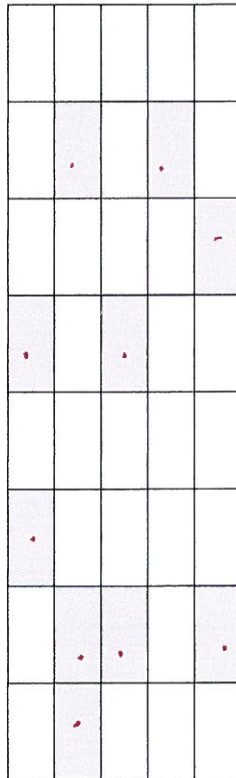
B2

- (b) Shade 75% of the following figure.



B1

- (c) What fraction of the following shape is shaded? Give your answer in its simplest form.



$\frac{10}{40} = \frac{1}{4}$

B1 B1



0 9

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Turn over.

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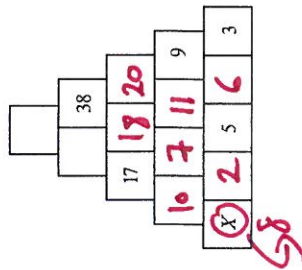
8. (a) Complete the following table, which shows the temperature at 11:00p.m. the change in temperature and the temperature at 11:00a.m. the next day, in each of three places. The first one has been done for you.

Place	Temperature at 11:00p.m.	Change	Temperature at 11:00a.m. next day
Swansea	-1°C	Up 4°C	3°C
New York	-2°C	Up 2°C	0°C
Moscow	-8°C	Up 5°C	-3°C

B1 B1 M1 A1

(b) Calculate 53% of 82. $0.53 \times 82 = 43.46$

- (c) Each block shown in this tower is to have a number displayed on it. For each pair of blocks that are next to each other in the same row, the number on the block above them is the total of the numbers on the two blocks. Some numbers are already displayed. What number should be written on the box marked X?



B1 B1 B1



1 0

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(4370-04)

12

9. (a) Describe in words the rule for continuing the following sequences.

(i) 5 9 13 17 21

Rule:

add four to previous number

[1]

(ii) 243 81 27 9 3

Rule:

divide previous number by 3

[1]

- (b) (i) A toy costs t pence. Write down, in terms of t , the cost of the toy in £.

$t \div 100 = \frac{t}{100}$

[1]

- (ii) On June 9th 2012, Beryl was m years old. Write down, in terms of m , her age on June 9th 2002.

$m - 10$

[1]

- (c) Solve $3x - 7 = 11$.

$3x = 11 + 7$

$3x = 18$

$x = \frac{18}{3} = 6$

[2]

- (d) There is a connection between the x and y coordinates in the following sequence of points.

(1, 4), (2, 5), (3, 6), (4, 7), ...

- (i) Using the same connection, complete the following: (5, ...)

8

[1]

- (ii) Using the same connection, complete the following: (x , $x+3$), giving your answer in terms of x .

[1]

10. The amount of money (in £) saved by Alan for each of 8 months was as follows:

43 30 75 54 62 46 24 82

- (a) Find the range of the amounts saved.

Range = largest - smallest
 $= 82 - 24$
 $= 58$

[1]

- (b) Find the mean of the amounts saved.

$43 + 30 + 75 + 54 + 62 + 46 + 24 + 82 = 416$

Mean = $416 \div 8 = 52$

[3]

- (c) If Alan had saved £15 less every month, what would be

- (i) the mean of the amounts saved,

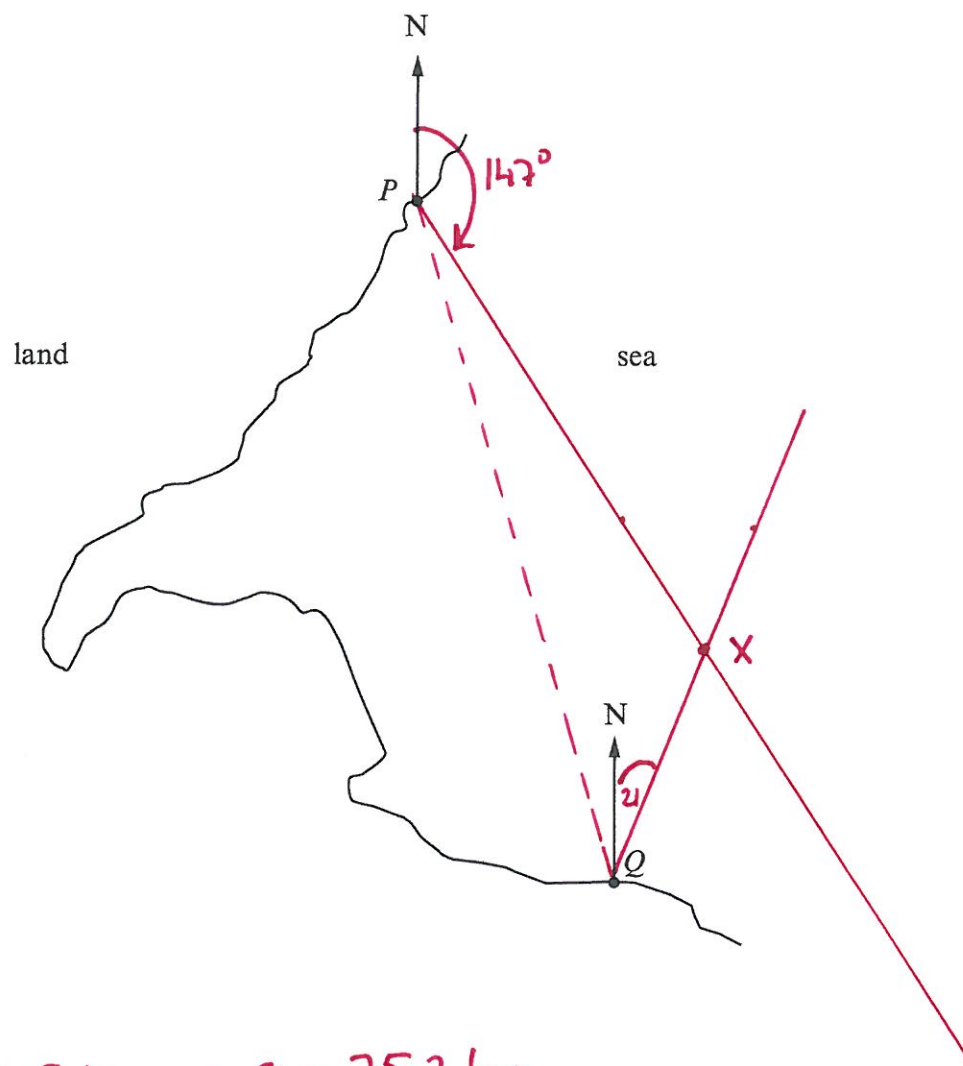
$52 - 15 = 37$

- (ii) the range of the amounts saved.

58

[1]

11. (a) P and Q are two ports shown on a map with scale $1 \text{ cm} = 8 \text{ km}$.
Find the straight-line distance, in km, from P to Q .



$$PQ = 9.4 \text{ cm} \times 8 = 75.2 \text{ km}$$

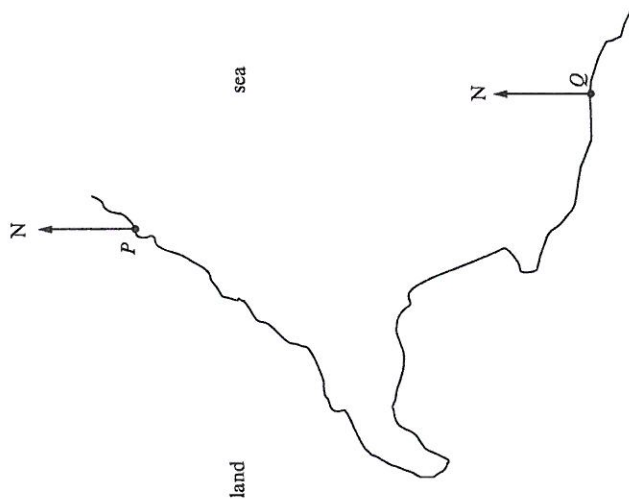
- (b) A ship is on a bearing of 147° from P and on a bearing of 021° from Q .
Plot the position of the ship and mark it X .

[3]

[3]



11. (a) P and Q are two ports shown on a map with scale $1 \text{ cm} = 8 \text{ km}$.
Find the straight-line distance, in km, from P to Q .



- (b) A ship is on a bearing of 147° from P and on a bearing of 021° from Q .
Plot the position of the ship and mark it X .

[3]

[3]



1 3

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(4370-04)

Turn over.

12. You will be assessed on the quality of your written communication in this question.

In an examination, candidates sit 2 written papers called Paper A and Paper B.
In a forthcoming examination there are 1200 candidates, each sitting Paper A and Paper B.
In 1 day, markers can either mark 60 Paper As or mark only half as many Paper Bs.
The marking must be completed in 10 days.
How many markers are needed to complete the marking in this time?

1 marker needs $1200 \div 60 = 20$ days to mark Paper A's

1 marker needs $1200 \div 30 = 40$ days to mark Paper B's.

So for Paper A's will need 2 markers to complete
in 10 days

and for Paper B's will need 4 markers to complete
in 10 days.

So 6 markers will be needed altogether.

[8]



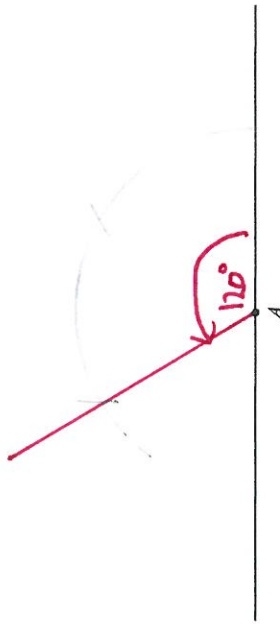
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(4370-04)

14

13. (a) Using a ruler and a pair of compasses, construct an angle of 120° at the point A on the line below. [2]



- (b) Using a ruler and a pair of compasses, bisect the line PQ . [2]



14. Miriam is planning a holiday in Pakistan.

- (a) Miriam went to an exchange bureau to get some Pakistan rupees for her holiday.



She exchanged £540 for 85 000 Pakistan rupees.

Complete the statement below, giving your answer correct to two decimal places.

$$85000 \div 540 = 157.41$$

'Exchange rate: £1 buys 157.41 Pakistan rupees'

- (b) Miriam knows that when it is 1p.m. in London it is 6p.m. local time in Karachi, Pakistan. Miriam is booked onto a flight leaving London on Tuesday at 13:50. The flight time is 7 hours 51 minutes.

- (i) On which day and at what local time should Miriam land in Karachi?

Time difference = +5 hrs.

So when she takes off in London, Karachi = 18:50

+ 7 hrs 05:50

+ 51 min

02:41

Day Weds Landing time 02:41

- (ii) Miriam's flight actually arrived 7 hours 45 minutes after departure. The aeroplane flying speed between London and Karachi was 434 knots. Given that 1 knot is 1.85 km/h, calculate the flying distance between London and Karachi.
Give your answer in kilometres.



$$\text{Dist} = \text{Speed} \times \text{time}$$

$$= 434 \times 7.75$$

$$= 3363.5$$

$$\times 1.85$$

$$= 6182.275 \text{ km}$$

[5]



15. Across the world, temperatures are measured using different units. All the unit scales are uniform.

Approximate conversions are often used to give a reading in more than one unit in scientific reports.

Use the information given below to complete the tables.

(a)

degrees Celsius	degrees Fahrenheit
20	68
30	86
40	104
50	122
60	140
70	158

[1]

(b)

kelvin	degrees Celsius
0	-273.15
100	-173.15
200	-73.15
300	26.85
400	126.85
500	226.85

[2]



(c)

kelvin	degrees Celsius	degrees Fahrenheit
340	66.85	152.33

$^{\circ}\text{C} \quad 26.85 + 40$

$^{\circ}\text{C} \rightarrow ^{\circ}\text{F}$

10 18 $^{\circ}\text{C}$ $18 \div 10 = 1.8$

$6.85^{\circ}\text{C} = 6.85 \times 1.8 = 12.33^{\circ}\text{F}$

$\Sigma \quad 66.85 = 140 + 12.33 = 152.33^{\circ}\text{F}$

[5]

M1
A1

B1

M1

A1

16. The diagram shows a rectangle ABCD.

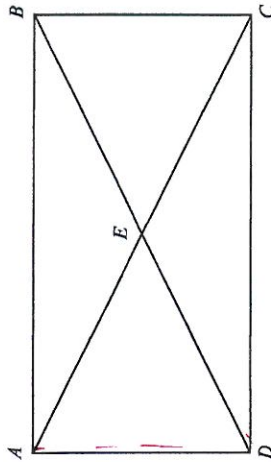


Diagram not drawn to scale

identical

Select 3 different pairs of congruent triangles shown in the diagram above and then complete the sentences below for your 3 selections.

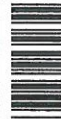
Triangle ADE is congruent to triangle BCE

Triangle AEB is congruent to triangle DEC

Triangle ADC is congruent to triangle BDC

[3]

B1
B1
B1



1 9



2 0

8

Examiner only

17. A factory production line packs buttons into bags. There are exactly 80 buttons packed into each bag. There is a mixture of different coloured buttons in each bag. A total of 600 bags of buttons were packed in a day.

The first 100 bags were checked and it was found that a total of 1200 red buttons had been used.

In the 600 bags of buttons it was found that the relative frequency of red buttons packed was 40%.

Calculate the relative frequency of red buttons packed in the final 500 bags.

600 bags $\times$ 80 buttons = 48000 buttons.

40% Red, = $0.40 \times 48000 = 19200$

So in final 500 bags 19200 - 1200 = 18000 red buttons.

So in final 500 bags 500×80 buttons = 40000 buttons

So proportion of red buttons = $\frac{18000}{40000} \times 100$

= 45%.

[7]



Examiner only

Question number	Additional page, if required. Write the question numbers in the left-hand margin.
M1	
M1	
B1	
M2	
A1	



PAPER 2 - FOUNDATION TIER

2013 Summer Linear Paper 2 (Calculator allowed) Foundation Tier	Marks	FINAL MARK SCHEME Comments
1. Parts (a) & (b) marked at the same time (a) (40.41) 39.51 (sausages) 8 (packs) (3.04) (stuffing) 75.84 (steaks) 158.8(0) (b) 10% = (£) 15.88 20% = (£) 31.76	B1 B1 B1 B1 M1 A1	For the 8 F.T. unless both 39.51 AND 75.84 are incorrect Any correct method for finding 20%. F.T. their total. Ignore extra decimal places in their answer. If (£)31.76 not given then (£) 127.04 gains M1 A1
2. 120km 120m 120mm 120cm 80kg 80g 80mg 800kg 2 litre 10 cm ³ 200 ml 1 ml 4m ² 400cm ² 40mm ² 400cm ³	✓ B1 B1 B1 B1	
3. Readings 960 (g), 240 (g) One block weighs (960 – 240)/8 = 90 (g)	B1 M1 A1	720 implies B1 FT readings
4. (a) chord tangent	B1 B1	
4. (b) (i) 12.1 (cm) to 12.5 (cm) inclusive	B1	
4. (b) (ii) Perpendicular through C	B1	Line should be between a line touching the left of A and between the p and a of 'passes'. Perpendicular does not need to cut AB
5. (a) (Viewed with diagram) Evidence of square counting 46 – 52 inclusive 276 – 312 inclusive (m ²)	M1 A1 B1	F.T. 'their 46 – 52' × 6 Unsupported answer in the range 276 – 312 gets 3 marks.
5. (b) Both lines Arc	B1 B1	Ignore extra lines that look like wrong attempts F.T. the end of their line and opposite curvature.
6. 7 by 4 rectangle 7 by 5 rectangle Two 3,4, 5 triangles Makes a valid net	B1 B1 B1 B1	Notes: Wrong dimensions gets B0; allow ±2mm Ignore 'flaps'. Must be a correct net that would produce the prism.
7. (a) 12/20, 9/15 and 6/10 circled	B2	B1 for any 2 correct and up to 1 incorrect OR B1 for all 3 correct and 1 incorrect.
7. (b) 6 shaded sectors OR 2 unshaded sectors	B1	
7. (c) 1/4 I.S.W.	B2	B1 for equivalent , e.g. 10/40 Do NOT accept decimals
8. (a) Up 2(°C) –8(°C)	B1 B1	Allow –2(°C) Down
8. (b) 53/100 × 82 = 43.46 I.S.W.	M1 A1	Any correct method for finding 53%. C.A.O. 43.46% gets M1, A0. Unsupported 43, 43.4, 43.5 gets M1, A0
8. (c) 73 35 (38) (17) 18 20 10 7 11 (9) 8 2 (5) 6 (3)	B1 B1 B1	For the 6 and the 11 For any four other correct numbers on F.T. For the 8, C.A.O. X=8 gets 3 marks.

2013 Summer Linear Paper 2 (Calculator allowed) Foundation Tier	Marks	FINAL MARK SCHEME Comments
9. (a) (i) Add 4 to the previous term	B1	Accept +4. B0 for $n+4$ or $4n+1$
9. (a) (ii) Divide the previous term by 3	B1	Accept $\div 3$. B0 for $n/3$
9. (b) (i) (£) $t/100$	B1	Accept $t \div 100$ or $(0).01t$
9. (b) (ii) $m - 10$	B1	Allow $m = m - 10$
9. (c) $3x = 18$ ($x =$) 6	B1 B1	F.T. $3x=b$, if b is a multiple of 3 then answer must be integer Accept embedded answers such as $3 \times 6 - 7 = 11$ $3 \times 6 = 18$ gets 0, but $3x = 18$ then $3 \times 6 = 18$ gets B2
9. (d) (i) (5, 8) I.S.W. OR (5, 8), (6, 9), (7, 9), ...	B1	But B0 for (5, 8, 9, ,10, ...)
9. (d) (ii) (x , $x+3$)	B1	B0 for (x ,+3)
All parts (a) to (c) marked together		
10. (a) (£) 58	B1	
10. (b) Sum of the amounts (416) Sum/8 (£) 52	M1 <u>M1</u> A1	For attempt to add the numbers For dividing a number in the range 330 – 500 by 8. C.A.O.
10. (c) (i) (£) 37	B1	F.T. 'their mean' – 15
10. (c) (ii) (£)58	B1	F.T. their range in part (a)
11. (a) 9.7 (cm) 9.7×8 $= 77.6$ (km)	B1 M1 A1	Allow $9.5 - 9.9$ FT 'their 9.7' Unsupported answers in the range 76 – 79.2 inclusive get 3 marks.
11. (b) <u>Use Overlay</u> Bearing 147° from P Bearing 021° from Q Point (X)	M1 M1 A1	Allow $\pm 2^\circ$ Allow $\pm 2^\circ$ F.T. if at least M1 awarded Unambiguous dots within the boundaries of the overlay can get the M1s. One unambiguous dot within the 'box' gets all 3 marks. An unambiguous point of intersection does not require X.
12. e.g. Paper A 1200/60 $= 20$ Paper B 1200/30 $= 40$ For either 2 markers OR 4 markers. 6 markers needed in total.	✓ M1 A1 M1 A1 B1 B1	Accept $20 \times 60 = 1200$ for M1, A1 Accept $40 \times 30 = 1200$ OR 2×20 for M1, A1 Unsupported answer of '6 (markers)' gets 6 marks. Unsupported 'about 6' OR 'at least 6' gets B0, B0.
Look for - spelling - clarity of text explanations, - the use of notation (watch for the use of papers, markers, days being appropriate) QWC2: Candidates will be expected to - present work clearly, with words explaining process or steps AND - make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer QWC1: Candidates will be expected to - present work clearly, with words explaining process or steps OR make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer	QWC 2	QWC2 Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar. QWC1 Presents relevant material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar. OR Evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar. QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling

2013 Summer Linear Paper 2 (Calculator allowed) Foundation Tier	Marks	FINAL MARK SCHEME Comments
13. (a) Arcs to show 60° or 120° 120° angle drawn with either 60° or 120° labelled correctly	M1 A1	Allow unlabelled angles of 60 as the supplementary angle will be 120. A0 for incorrect labelling of the 60° and/or 120°, or no labelling. Watch out for when either end of the line to A is used as the radius of the arc.
13. (b) Correct intersecting arcs which are above and below the given line. Line bisector	M1 A1	Candidates may draw 2 pairs of correct arcs above the line (or 2 pairs below the line) to get this M1.
14. (a) 85000/540 157.41	M1 A2	Mark final answer A1 for sight 157(.407407...) not to 2dp as required
14. (b)(i) Wednesday Method, e.g. 13:50 + 5 hours + 7hrs 51 minutes (0)2(:)41 or 2(:)41 am	B1 M1 M1 A1	Do not penalise poor notation for M marks Award M2 for '+12hr 51mins' Notation for 24 or 12 hour time must be correct Do not accept 241pm The A mark depends on M2, award all marks for a correct answer
14. (b)(ii) (Speed) 434 × 1.85 (802.9 or 803) (Distance) × 7.75 6222(.475 km) or 6223.(25km)	✓ M1 M2 A2	M1 for '× 7hr 45min' 'or × 465 min' A1 for an answer of 3363.5, OR 6215.5(km) or other similar answers that would be correct apart from premature approximation
15. (a) 122	B1	
15. (b) (0 kelvin) -273.15 and (100 kelvin) -173.15	B2	B1 for either, or 2 negative answers with their 0 kelvin answer being 100 less than their 100 kelvin answer
15.(c) 340 kelvin to Celsius: working with 100 difference in both kelvin and Celsius 66.85 (degrees Celsius) Answer for Fahrenheit <u>between 140 and 158</u> exclusive 6.85 tenths of 18 OR (6.85/10)×18 152(.33 Fahrenheit)	✓ M1 A1 B1 M1 A1	e.g. sight of 40 + 26.85, 126.85 – 60, 340-273.15 Look for response in the table. Accept 66.8, 66.9, 67 Look for evidence in the table. FT from rounding 66.85 (Celsius), e.g. 7 tenths of 18 Accept 153 from correct working <i>Allow final B1, M1, A1 for a correct evaluation of 'their 66.85' × 1.8 + 32</i> Penalise reversed answers - 1
16. Any three different pairs of congruent triangle identified	✓ B3	B1 for each pair. Watch out for repeats. If letters are used then ignore the order of letters 'Watch out for usage of 4 letters which still make a triangle (eg ABED)'
17. 80 × 600 × 0.4(0) = 19200 19200 – 1200 OR 18000 red buttons ÷ 500 AND ÷ 80 OR ÷ 40 000 0.45 or 45%	✓ M2 A1 B1 m2 A1	M1 for product of any two seen. Or equivalent calculation FT 'their 18000' provided M2 awarded m1 for ÷ 500 or ÷ 80 Accept 36 buttons per bag as evidence for m1 CAO