Cambridge International Examinations
Cambridge International General Certificate of Secondary Education (9–1)

Cambridge IGCSE

CANDIDATE NAME	

CENTRE NUMBER		CANDIDATE NUMBER	

MATHEMATICS 0626/06

Paper 6 (Extended) **May/June 2017**

2 hours

Candidates answer on the Question Paper.

Additional Materials: Geometrical instruments
Tracing paper (optional)

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
Electronic calculators should be used.
If working is required for any question it must be shown below that question.
If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.
For π, use either your calculator value or 3.142.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.
The total of the marks for this paper is 96.

[Turn over

1   Roy has 50 packets of chocolates.
    The table shows how many chocolates are in each packet.

Number of chocolates	Frequency
29	2
30	26
31	13
32	6
33	3

(a) Calculate the mean number of chocolates in a packet.

.... [3]
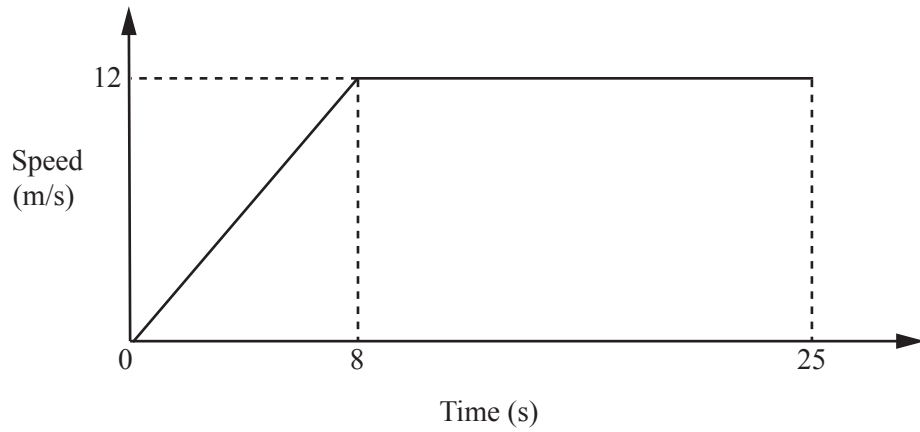
(b) The label on each packet says 'Average contents 30 chocolates'.

Is this claim fair?
Give a reason for your answer.

....

.... [1]

2

This speed-time graph shows the speed of a particle during the first 25 seconds of its motion.

(a) Calculate the acceleration for the first 8 seconds of the particle's motion.

....m/s^2 [1]

(b) Calculate the distance travelled during the first 25 seconds.

.... m [3]

3 **(a)** The table shows the masses of the planets Mars and Mercury.

Planet	Mass (kg)
Mars	6.4×10^{23}
Mercury	3.3×10^{23}

(i) Calculate the mass of Mercury as a percentage of the mass of Mars.

....% [2]

(ii) The mass of Mars is 870% of the mass of the Moon.

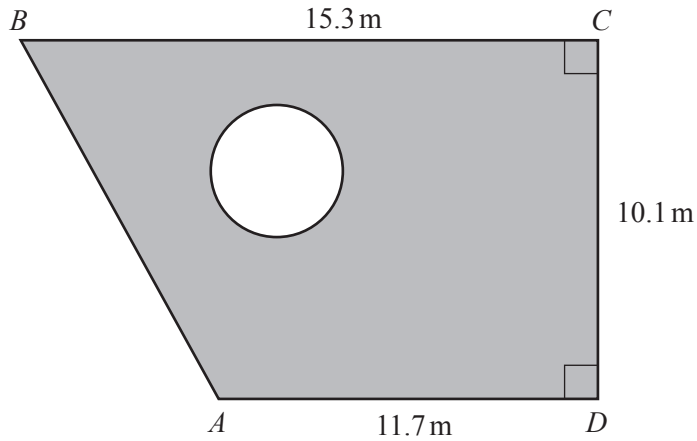Calculate the mass of the Moon.
Give your answer in standard form.

.... kg [2]

(b) The mass of the Sun is 2×10^{30} kilograms.
Three quarters of the mass of the Sun is hydrogen.
One **gram** of hydrogen contains 6×10^{23} atoms.

Calculate the number of hydrogen atoms in the Sun.
Give your answer in standard form.

.... [4]

4

B _____ 15.3 m _____ C

NOT TO
SCALE

10.1 m

A _____ 11.7 m _____ D

The diagram shows Juanita's garden *ABCD*.
ABCD is a trapezium.
There is a circular pond of diameter 2.9 m in the garden.

Juanita sows grass seed in the shaded area.
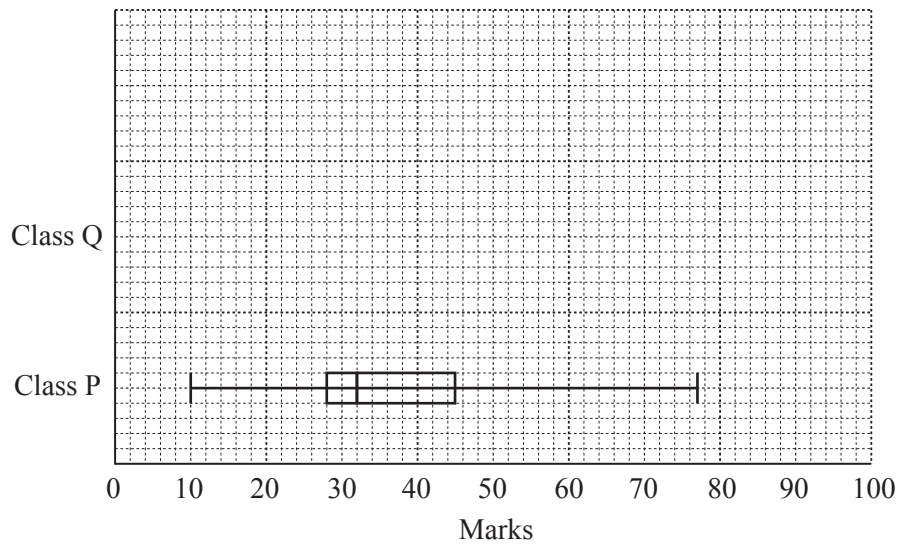She uses 70 g of grass seed for each square metre of garden.
A bag contains 750 g of grass seed.

Calculate the number of bags of grass seed Juanita needs and the amount of grass seed she has left over.

Number of bags = ...

Amount left over = ... g [7]

5 This box plot summarises the results of Class P in their Geography exam.

(a) Work out the inter-quartile range for Class P.

.... [2]

(b) The results of Class Q in the same Geography exam are summarised in this table.

Lowest mark	18
Range	67
Inter-quartile range	32
Median	36

One quarter of Class Q scored at least 52 marks.

On the grid above, draw a box plot to summarise the results of Class Q. [3]

(c) Make **two** comparisons between the results of Class P and Class Q.
Give a reason to support each comparison.

1 ....

....

2 ....

.... [2]

6 Raul and Francoise each open a bank account with £500 on the same day.
Raul receives 1.2% simple interest at the end of each month.
Francoise receives 1% compound interest at the end of each month.

(a) Show that, after 2 **years**, Raul has £9.13 more in his account than Francoise has in her account.
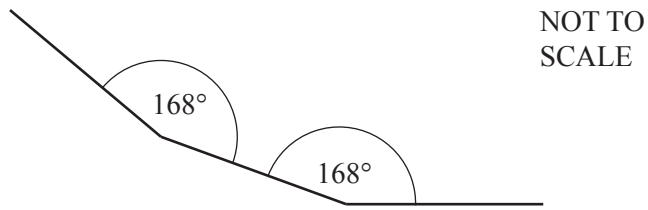
[4]

(b) Raul has more money in his account than Francoise has in her account for the first n months after opening the accounts.
After n months, Francoise has more in her account.

Find the value of n.

$n = $ .... [3]

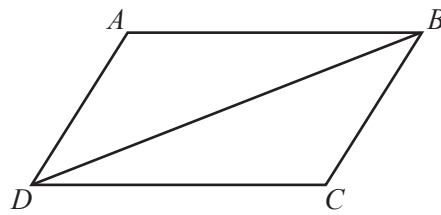**7** **(a)**

NOT TO SCALE

168°

168°

The diagram shows part of a regular polygon.

(i) On the diagram, mark and label an exterior angle of the polygon. [1]

(ii) Calculate the number of sides of the polygon.

....[3]

(b)

NOT TO
SCALE

ABCD is a parallelogram.
Lizzie is trying to prove that triangle *ABD* is congruent to triangle *CDB*.

This is her proof.

> 1. BD is common to both triangles
>
> 2. ∠DAB = ∠BCD (reflection symmetry)
>
> 3. ∠ADB = ∠DBC (alternate angles)
>
> 4. Therefore triangle ABD is congruent to triangle CDB (RHS)

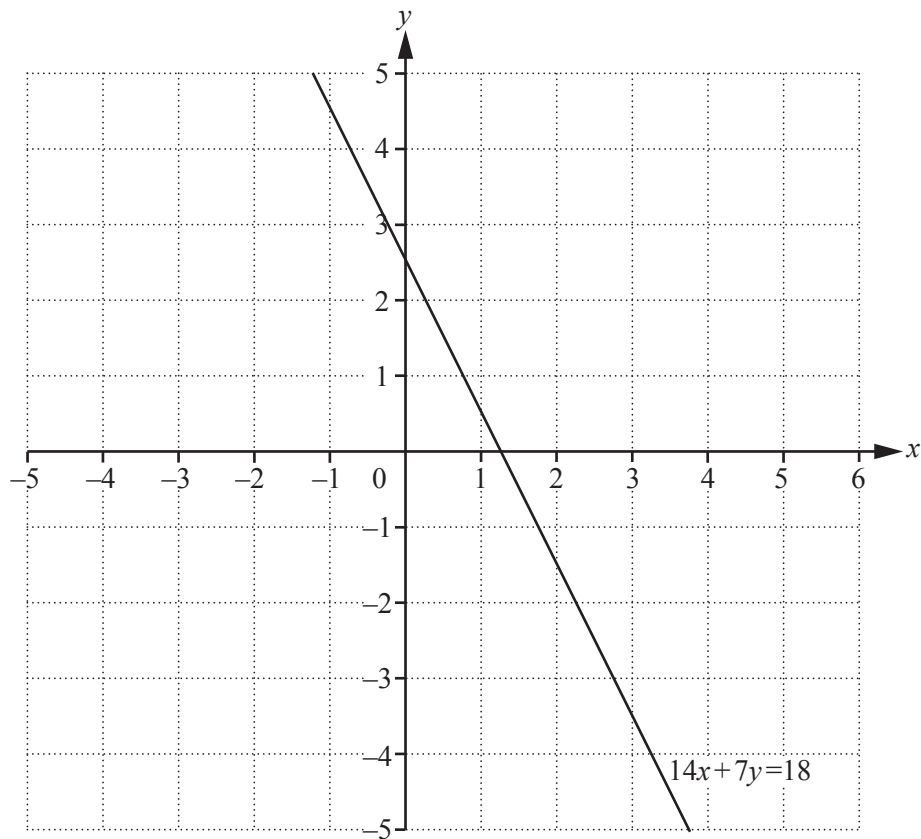**(i)** Explain **one** error in Lizzie's proof.

....

.... [1]

(ii) Rewrite **two** lines of Lizzie's proof to make it correct.

....

.... [2]

8 The grid shows the graph of $14x + 7y = 18$.

(a) On the same grid, draw the graph of $2x - y = 2$. [2]

(b) (i) The region **R** contains the points which satisfy the following three inequalities.

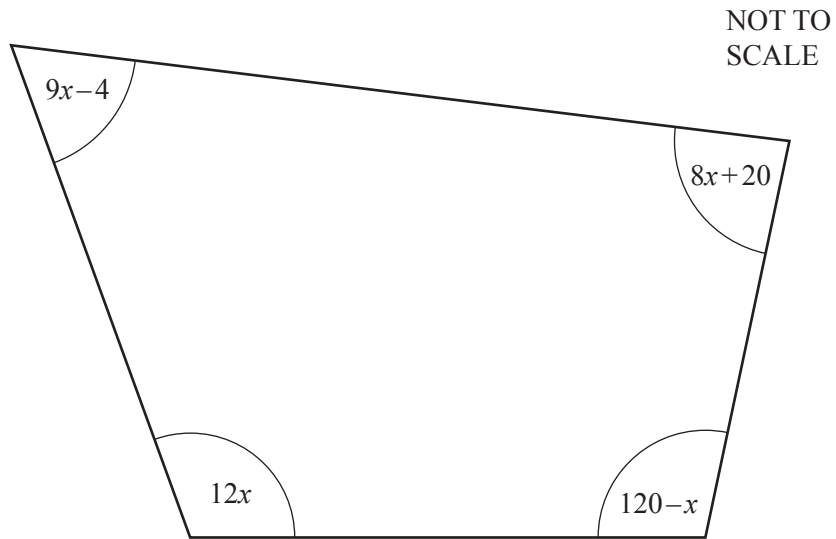$$14x + 7y \geqslant 18$$
$$2x - y \leqslant 2$$
$$y < 3$$

On the grid, find and label the region **R**.
Shade the regions that are **not** required. [2]

(ii) Write down all the points with integer co-ordinates in region **R**.

.... [2]

9 The diagram shows a quadrilateral with angles in degrees.

NOT TO SCALE

Shoshanna thinks this is a cyclic quadrilateral.
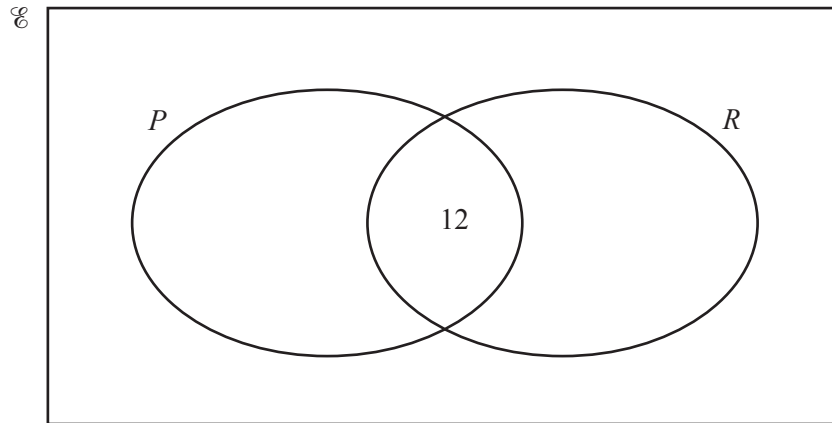
Show that she is correct.
State any geometrical reasons you use.

[5]

10 (a) There are 80 students in Year 11.

- 12 students do both Photography (P) and Rugby (R)
- 7 students do neither Photography (P) nor Rugby (R)
- 38 students do Rugby (R)

(i) Complete the Venn diagram for the students in Year 11.

[2]

(ii) How many students do Photography or Rugby but not both?

....[1]

(iii) Gareth is a Year 11 student.

Given that Gareth does Rugby, find the probability that he does Photography.

....[1]

(b) Shade the regions indicated.

$\mathcal{E}$

A   B

C

$(A \cup B \cup C)'$

$\mathcal{E}$
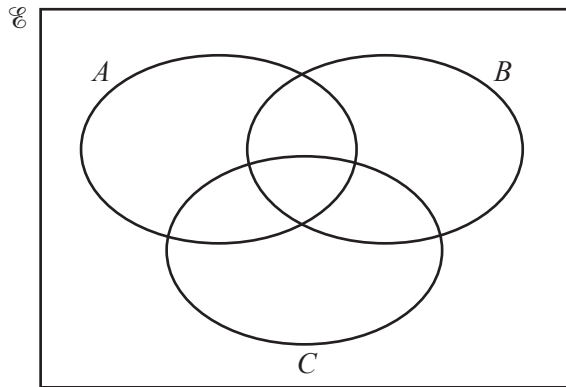
A   B

C
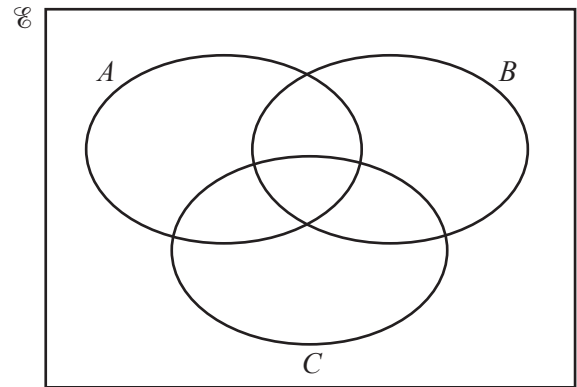
$A' \cap (B \cup C)$

[2]

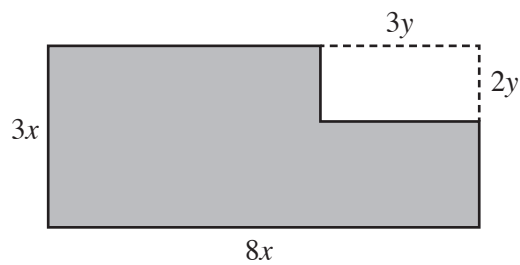**11 (a)** Write as a single fraction.

$$\frac{3x+2}{x+1} + \frac{2}{5}$$

Give your answer in its simplest form.

.... [3]

(b) In this part, all length are in centimetres.

A rectangle of length $3y$ and width $2y$ has been removed from a large rectangle of length $8x$ and width $3x$.

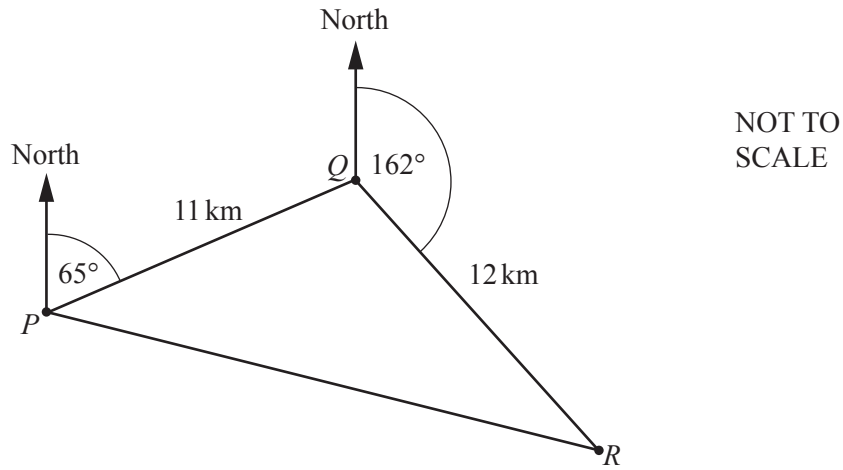Show that the shaded area can be written as $6(px+y)(px-y)$, where p is an integer to be found.

[4]

(c) Solve.

$$8^{\frac{n}{3}} = \frac{1}{16}$$

$n =$ .... [3]

12

North

North

NOT TO
SCALE

Q 162°

11 km

65°

12 km

P

R

A boat starts from point P and sails round a triangular circuit as shown in the diagram.
Q is 11 km from P on a bearing of 065°.
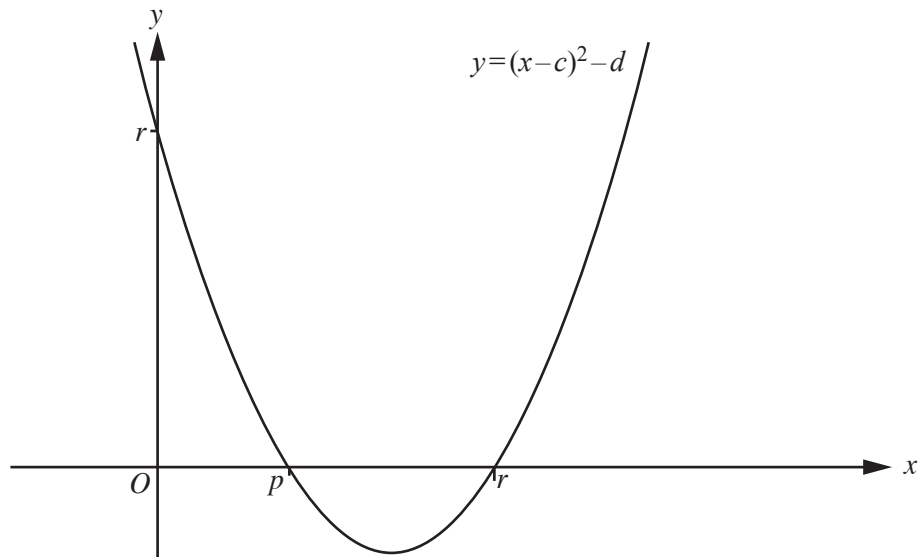R is 12 km from Q on a bearing of 162°.

(a) Calculate the distance RP.

.... km [5]

(b) Calculate the bearing of *P* from *R*.

.... [4]

 [Turn over

13

The diagram shows a sketch of the quadratic function $y = (x-c)^2 - d$.
The curve crosses the x-axis at the points where $x = p$ and $x = r$.
It crosses the y-axis at the point where $y = r$.

(a) Write down the co-ordinates of the minimum point of the curve.

(........................ , ...) [2]

(b) Write down the equation of the line of symmetry of the curve.

.... [1]

(c) Use the points where the curve crosses the x-axis to write the equation of the curve in factorised form.

$y =$ (........................)(........................) [2]

(d) By first rearranging $(x-c)^2 - d = 0$ to make x the subject, explain why $p = c - \sqrt{d}$.

....

.... [4]

(e) Explain why $c^2 - d = r$.

....

.... [1]

(f) Find an expression for $c^2 - d$ in terms of p **and** r.

$c^2 - d = $ .... [3]

(g) (i) Explain why $p = 1$.

....

.... [1]

(ii) Find r given that $d = 16$.

$r = $ .... [2]

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