

CANDIDATE
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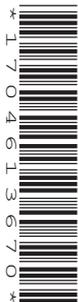
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CENTRE
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MATHEMATICS

0626/05

Paper 5 (Core)

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 needed 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.

This syllabus is regulated for use in England as a Cambridge International Level 1/Level 2 (9–1) Certificate.

This document consists of **20** printed pages.

1 Archie goes shopping.

- (a) He buys 350 g of ham.
The ham costs £2.36 for 100 g.

How much does Archie pay for the ham?

£ [2]

- (b) He buys 575 g of sausages.
The sausages cost £6.80 per kg.

(i) How much does Archie pay for the sausages?

£ [2]

(ii) Archie pays for the sausages with a £20 note.

How much change does he receive?

£ [1]

- (c) A pack of 10 eggs costs £2.89.
A pack of 6 eggs costs £1.77.

Which is better value, a pack of 10 or a pack of 6?
Show your working.

..... [2]

- (d) In a special offer the prices of cakes are reduced by 25%.
A lemon cake costs £3.80 before the reduction.

Calculate the reduced price of a lemon cake.

£ [2]

2 This is the train timetable from Adenmouth to Emford.

Adenmouth	06 58	08 15	10 25	13 15	15 25	18 15
Blamford	08 13	09 28	11 43	14 28	16 43	19 28
Cragton	08 31	09 46	12 05	14 46	17 05	19 46
Dorty	09 00	10 15	12 36	15 15	17 36	20 15
Emford	09 23	10 38	13 02	15 38	18 02	20 38

(a) Sally goes from Blamford to Dorty on the train.
She catches the train at 09 28.

(i) At what time does her train arrive at Dorty?

..... [1]

(ii) How many minutes does her train journey take?

..... minutes [1]

(b) Jiang needs to be in Emford by 2.20 pm.

What is the latest train he can catch from Cragton to arrive in Emford on time?

..... [1]

(c) A train left Adenmouth at 06 58 and arrived at Blamford on time.
It travelled a distance of 65 miles.

Calculate the average speed of the train in miles per hour.

..... mph [3]

- (d) Fran and her two children are travelling from Adenmouth to Emford.
Fran has a family railcard.
When Fran uses the railcard she pays

- $\frac{2}{3}$ of the standard adult ticket price for her ticket,
- 35% of the standard adult ticket price for each of the children's tickets.

The price of a standard adult ticket is £48.

The price of a standard child ticket is £24.

Show that Fran will save £30.40 by using her railcard.

[4]

- 3 Jack wants to change his gas supplier.
He will choose the cheaper of these two plans.

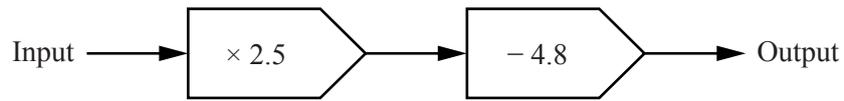
Plan A	Plan B
5.12 pence per kilowatt hour	3.67 pence per kilowatt hour plus 23.5 pence per day

Jack uses 2400 kilowatt hours of gas in 90 days.

Which plan should Jack choose?
Show how you decide.

..... [4]

- 4 (a) Here is a function machine.



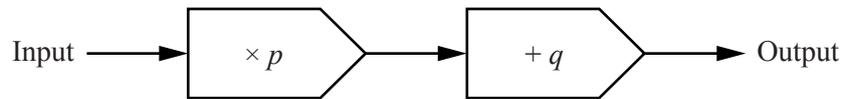
- (i) Work out the Output when the Input is 4.

..... [1]

- (ii) Work out the Input when the Output is 12.7.

..... [2]

- (b) This is a different function machine.



p and q represent numbers.

When the Input is 0 the Output is 5.

When the Input is 8 the Output is 33.

Find the value of p and the value of q .

$p =$

$q =$ [3]

- 5 A company carries out a survey with its employees about their journeys to work. The survey has three questions. Some employees do not answer all the questions.

(a)

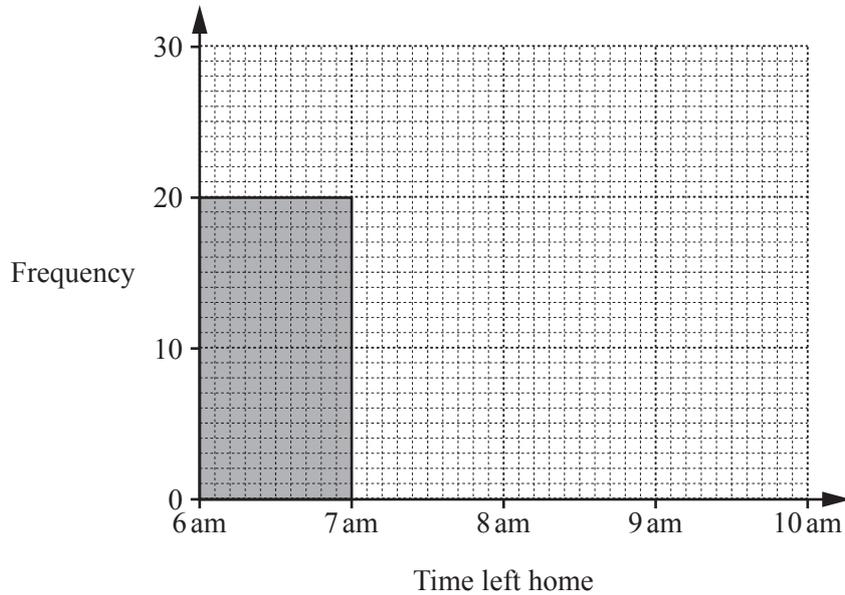
Question 1

At what time do you leave home to travel to work?

The results are shown in this frequency table.

Time left home	6 am to before 7 am	7 am to before 8 am	8 am to before 9 am	9 am to before 10 am
Frequency	20	28	13	6

- (i) Complete the frequency graph below.



[2]

- (ii) One of the employees who answered Question 1 is selected at random.

What is the probability that this employee left home from 8 am to before 9 am?

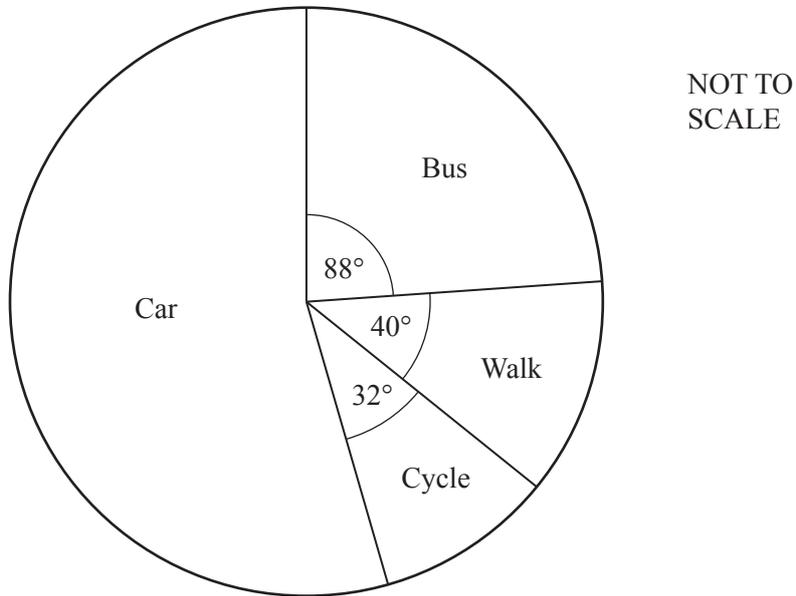
..... [2]

(b)

Question 2

What form of transport do you use to travel to work?

The results are shown in this pie chart.



(i) 4 employees said that they cycled to work.

Calculate how many employees said that they travelled to work by car.

..... [4]

(ii) A businessman is setting up a new company. He uses the results of Question 2 to estimate the number of parking spaces he needs for his employees.

Give a reason why this may not be sensible.

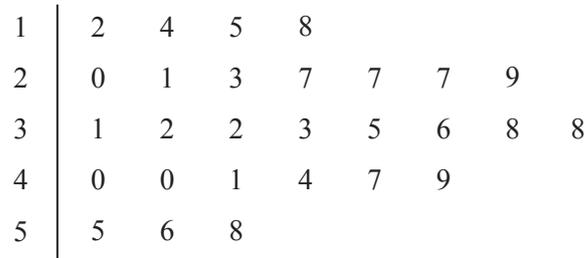
.....
..... [1]

(c)

Question 3

How long, in minutes, does it usually take you to travel to work?

Only 28 employees answered this question.
The results are shown in this stem and leaf diagram.



Key: 4 | 7 represents 47 minutes

(i) What is the longest time that an employee took to travel to work?

..... minutes [1]

(ii) Find the mode.

..... minutes [1]

(iii) Work out the median.

..... minutes [2]

6 Oliver, Mia and Corrie are builders.

- (a) Oliver is making mortar.
 He mixes cement and sand in the ratio 2 : 9.
 He makes 16.5 kg of mortar mix.

Work out how much cement and how much sand Oliver uses.

cement kg
 sand kg [2]

- (b) Mia is making plaster.
 She mixes cement and sand in the ratio 1 : 3.
 She says that one third of the plaster mix is cement.

Explain why Mia is wrong.

.....
 [1]

- (c) Corrie is making concrete.
 He mixes cement, sand and aggregate in the ratio 1 : 2 : 4.
 He uses 22.6 kg of sand.

How much concrete mix does Corrie make?

..... kg [3]

- 7 (a) Tommy solves this equation.

$$6x - 2 = x + 9$$

Here is his working.

$6x - 2 = x + 9$ $6x = x + 7$ $5x = 7$ $x = 1.4$
--

- (i) Tommy has made an error in his working.

Explain his error.

.....
 [1]

- (ii) Work out the correct solution to the equation.

$$x = \dots\dots\dots [1]$$

- (b) (i) Show that $4(2x - 9) - 3(x - 7)$ can be written as $5x - 15$.

[2]

- (ii) Solve.

$$4(2x - 9) - 3(x - 7) = 0$$

$$x = \dots\dots\dots [1]$$

- 8 The Overall Stopping Distance for a car is found by **adding** Thinking Distance and Braking Distance.

For a car travelling at a speed of V miles per hour, a formula for

- Thinking Distance, T feet, is $T = V$,
- Braking Distance, B feet, is $B = \frac{V^2}{20}$.

- (a) Show that the formula for the Overall Stopping Distance, D feet, can be written as

$$D = V\left(1 + \frac{V}{20}\right)$$

[1]

- (b) A car is travelling at a speed of 45 miles per hour.

Work out the Overall Stopping Distance.

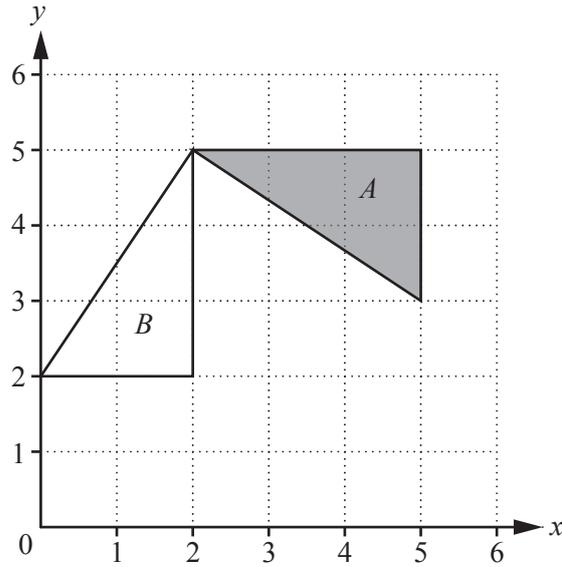
..... feet [2]

- (c) A car is travelling at a speed that has a **Braking Distance** of 210 feet.

Work out the **Overall Stopping Distance** at this speed.

..... feet [4]

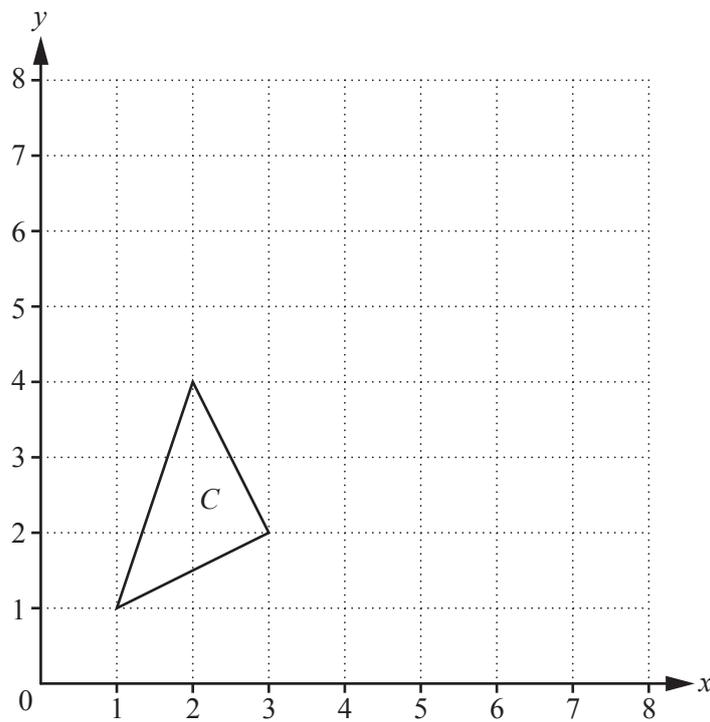
9 (a)



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

.....
 [3]

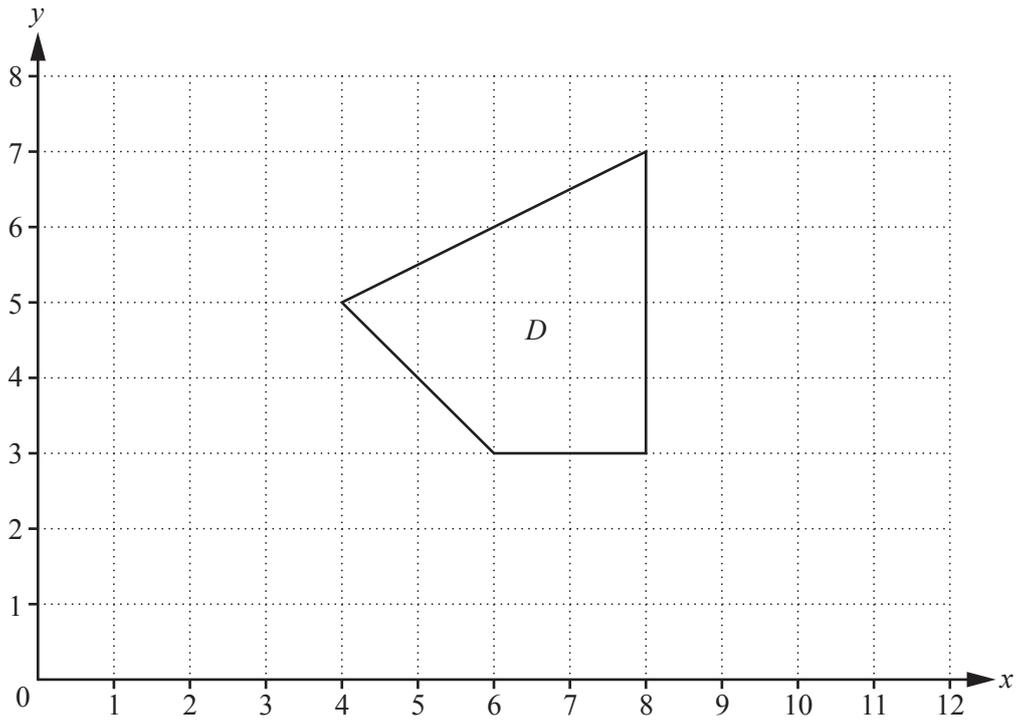
(b)



Reflect triangle *C* in the line $x = 4$.

[2]

(c)



Enlarge shape *D* with centre (0, 1) and scale factor $\frac{1}{2}$.

[2]

- 10 (a)** In 2001 the population of Wellingborough was 72 500.
By 2011 the population had increased by 4%.

Work out the population of Wellingborough in 2011.

..... [2]

- (b)** In 2001 the population of Nottingham was 268 900.
By 2011 it had risen to 305 700.

Work out the percentage increase in the population of Nottingham from 2001 to 2011.

..... % [3]

- (c)** In 2011 the population of Birmingham was 1 073 000.

Write 1 073 000 in standard form.

..... [1]

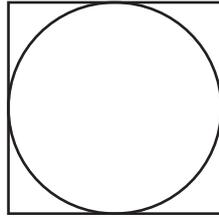
- (d)** In 2012 the population of Greece was 1.11×10^7 and
the population of India was 1.23×10^9 .

How many more people lived in India than in Greece in 2012?

Write your answer in standard form correct to 3 significant figures.

..... [3]

11 (a)



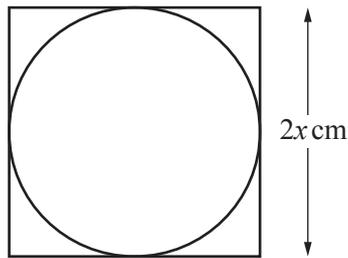
NOT TO SCALE

A circle fits exactly into a square.
The area of the square is 81 cm^2 .

Calculate the area of the circle.

..... cm^2 [3]

(b)



NOT TO SCALE

Another circle fits exactly into a different square.
The square has sides of length $2x \text{ cm}$.

(i) Show that the ratio area of square : area of circle = $4 : \pi$.

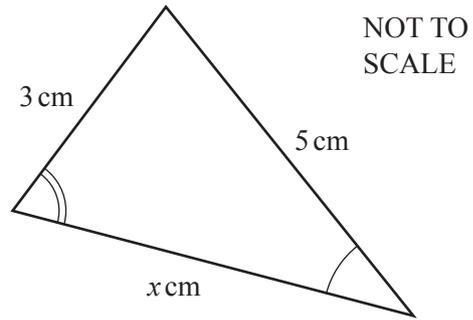
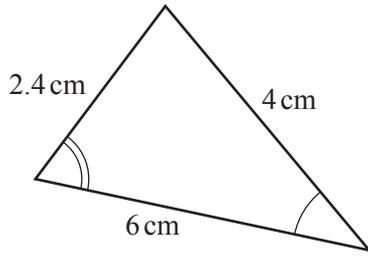
[2]

(ii) The area of the circle is 20 cm^2 .

Calculate the area of the square.

..... cm^2 [2]

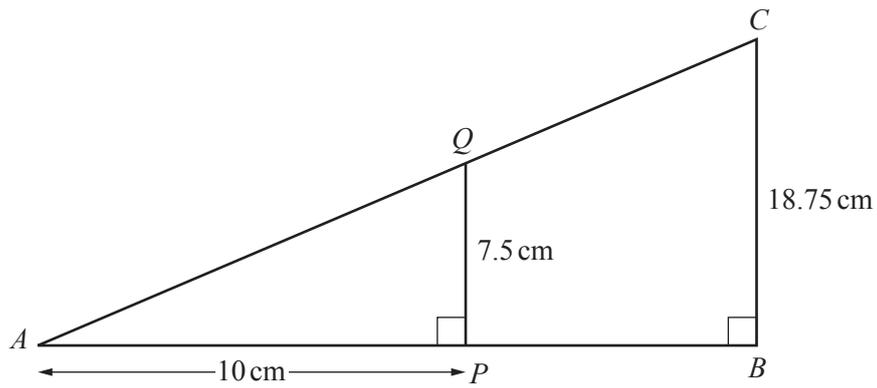
- 12 (a) These two triangles are similar.



Work out the value of x .

$x = \dots\dots\dots$ cm [2]

- (b) This diagram shows two right-angled triangles, APQ and ABC .



NOT TO
SCALE

Calculate the length of AC .

$AC = \dots\dots\dots$ cm [4]

Question 13 is printed on the next page.

13 (a) Here is a sequence.

7 13 19 25 ...

(i) Write down the next term of this sequence.

..... [1]

(ii) Find an expression for the n th term of this sequence.

..... [2]

(b) An expression for the n th term of a different sequence is $3n^2 + 2$.
110 is a term in this sequence.

Find the next term after 110 in this sequence.

..... [4]

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