Please write clearly in block capitals.

Centre number | | | | | | Candidate number | | | | |

Surname _____

Forename(s) _____

Candidate signature _____

Functional Skills Certificate
FUNCTIONAL MATHEMATICS

Level 2

Monday 16 January 2017 Morning Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:
- a calculator
- mathematical instruments
- a copy of the data book (examination) (enclosed).

Instructions
- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.
- State the units of your answer where appropriate.

Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 60.
- You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer book.
- Evidence of checking is specifically assessed in Questions 2(a) and 4(e). These questions are indicated with a †.

Advice
- In all calculations, show clearly how you work out your answer.

Answer **all** questions in the spaces provided.

1 **Cookies**

I make and sell cookies.

Chris

Chris makes batches of cookie dough.

Here are the ingredients he needs to make one batch.

One batch of cookie dough	
200 g	margarine
250 g	flour
100 g	sugar
2	eggs
1 teaspoon	baking powder

One batch makes exactly

16 large cookies

or

24 small cookies.

1 (a) On Monday, Chris uses 400 g of margarine to make cookie dough.
He uses all of the dough to make **small** cookies.

How many can he make?
Circle your answer.

[1 mark]

2 24 32 48

1 (b) On Tuesday, Chris makes one batch of cookie dough.
He uses some of the dough to make 2 **large** cookies.

He says,

"I will use the rest of the dough to make some **small** cookies."

How many **small** cookies can he make?

[3 marks]

Question 1 continues on the next page

1 (c) On Wednesday, Chris makes cookies using 10 batches of dough.
He will sell all the cookies in bags at these prices.

Bag of 4 large cookies	£1.35
Bag of 8 small cookies	£1.75

Here are his costs.

Total cost of ingredients	£19.50
Bags	2p each

He is going to make

only large cookies

or

only small cookies.

He says,

"If I make and sell only large cookies my total profit will be £1.30 more than if I make and sell only small cookies."

Is he correct?
You **must** show your working.

[8 marks]

12

2 **Cars**

There is a **data sheet** for Cars.

Alfie is thinking about buying a new car.

Alfie

†2 (a) Alfie plans to

buy a new car after 1 April 2017

keep the car for 5 years.

Work out the **total** vehicle tax he will pay if he buys a Toyota Aygo.

[2 marks]

Check your answer.
Show how you have done your check.

[1 mark]

Alfie will use his new car for work.

2 (b) He makes these notes.

> I drive a total of 62 miles each day for work.
> I work for 5 days each week.
> I work for 46 weeks each year.
>
> Diesel costs £4.96 per gallon.
> Petrol costs £4.87 per gallon.
>
> My actual fuel efficiency will be 20% **lower** than the official value.

He says,

"I will spend at least £1300 a year on fuel for work if I buy a Toyota Aygo."

Is he correct?
You **must** show your working.

[7 marks]

2 (c) Alfie buys a car.

For 8 days, he records the time he takes for

his journey to work by car

and

his journey home by car.

	Journey to work by car (minutes)	**Journey home by car (minutes)**
Day 1	42	47
Day 2	46	52
Day 3	38	39
Day 4	42	44
Day 5	46	49
Day 6	52	58
Day 7	48	40
Day 8	39	36

He knows that his total journey time to work and home by **train** each day would be $1\frac{1}{2}$ hours.

Alfie has 120 working days left in the year.

He says,

> "I estimate that on 85 days out of 120 the total journey time would be less by car than by train."

Based on these 8 days, is his estimate correct?
You **must** show your working.

[5 marks]

15

3 **Hotel**

I am the manager of a hotel with 168 rooms.

Kim

3 (a) The hotel has 128 standard rooms and 40 deluxe rooms.
Each room is cleaned the day after it has been used.

To clean a room is

25 minutes work for a standard room

30 minutes work for a deluxe room.

Each cleaner

starts work at 8.30 am and finishes work at 2.00 pm

has **two** 20-minute breaks.

On Tuesday, all the rooms are used.

How many cleaners are needed on Wednesday?
You **must** show your working.

[6 marks]

Each day, the cleaners replace used milk cartons.

3 (b) The table shows the number of milk cartons put in 50 rooms yesterday.

Number of milk cartons	Number of rooms
4	18
3	8
2	11
1	9
0	4

Show that 2.54 was the mean number of milk cartons put in the 50 rooms.

[3 marks]

3 (c) Kim estimates the cost of the milk cartons she needs next year.
She makes these notes.

365 days in a year

75% of the 168 rooms will be used each day

An average of 2.54 cartons per day for each room used

A box of 240 cartons costs £12.60

Kim says,

"The cost will be less than £6000"

Is she correct?
You **must** show your working.

[7 marks]

16

4 **Transporting hamsters**

There is a **data sheet** for Transporting hamsters.

Ola makes cuboid boxes for transporting hamsters.

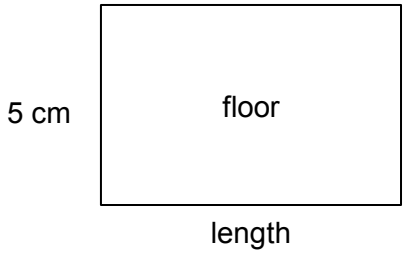
She is making a box to transport **one** 4-week-old Syrian hamster.

She wants

the width of the box to be 5 cm

the floor area to be no more than 60 cm^2

4 (a) Ola draws this sketch of the floor of the box.



Not drawn accurately

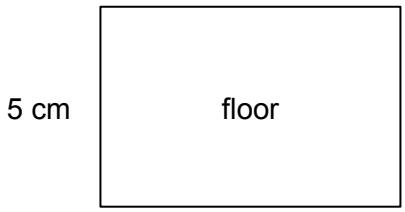
Write a suitable measurement for the length.

[1 mark]

4 (b) Complete the sketch of the net of the box on the opposite page.
Include the measurements of all edges.
Do **not** include windows.

[3 marks]

Not drawn accurately



Ola has made a different box.

4 (c) One side of this box has

an area of 112 cm^2

a 6 cm by 4 cm rectangular window.

The area of the window must be between 16% and 25% of the area of the side.

Is the area of the window suitable?
You **must** show your working.

[4 marks]

4 (d) The temperature in the box must be between 46ºF and 85ºF
Ola's thermometer only measures in degrees Celsius.

Work out the two temperatures in degrees Celsius to the nearest whole number.

[3 marks]

Ola makes a box with a floor area of 2000 cm^2
The box is tall enough to transport Syrian hamsters or Dwarf hamsters.

†4 (e) Ola could transport 6-week-old Syrian hamsters in this box.

Work out the **maximum** number she could transport.

[2 marks]

Check your answer.
Show how you have done your check.

[1 mark]

4 (f) Instead, Ola could transport 6-week-old Dwarf hamsters in the box.

How many **more** Dwarf hamsters than Syrian hamsters could she transport?

[3 marks]

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END OF QUESTIONS

There are no questions printed on this page

DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED