AQA

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).

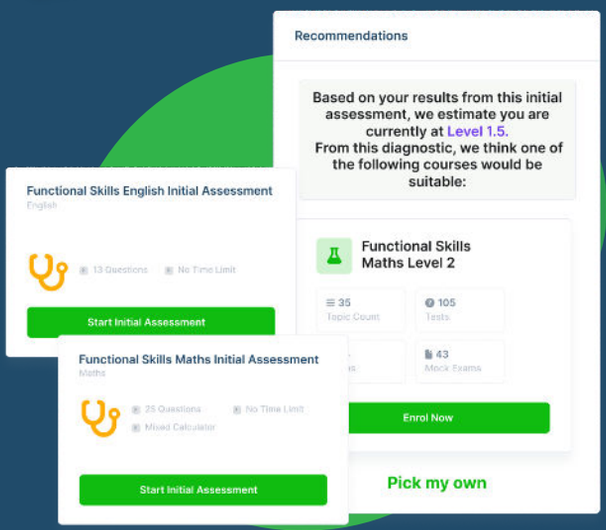
Instructions
- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want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

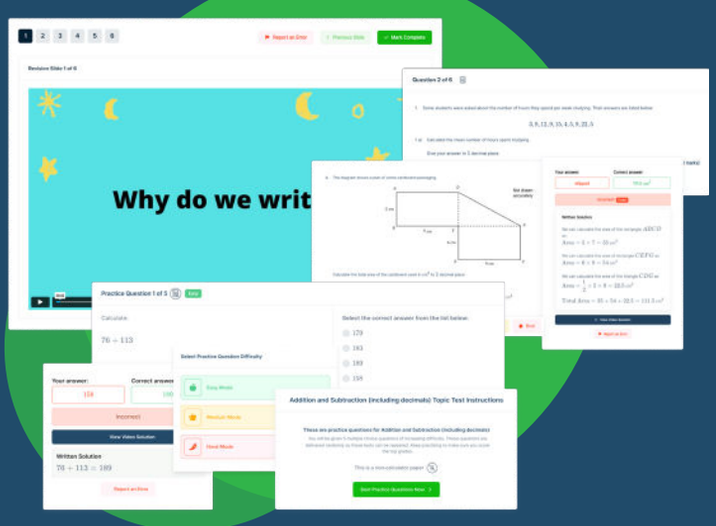
PASS FUNCTIONAL SKILLS

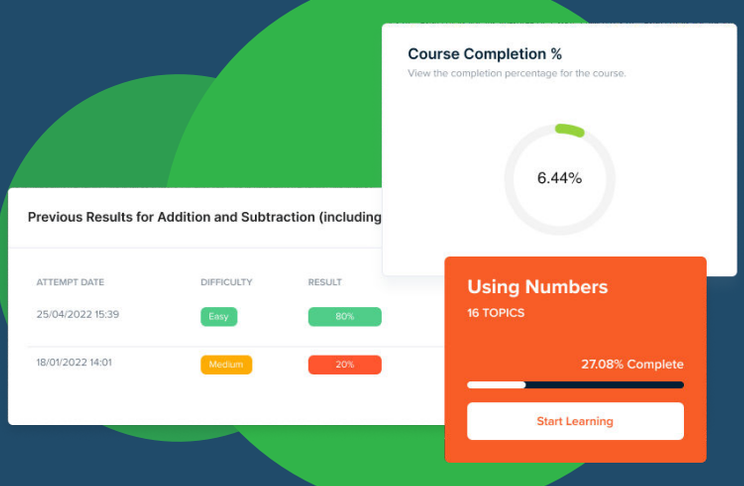
FUNCTIONAL SKILLS ONLINE COURSES



- Your answers are analysed to determine your Current Level
- Suggested courses for you to enrol on based on your calculated level
- Always know the level you are currently working at
- Determine when you are ready to sit your exam

- Explainer videos on every topic
- Quick-fire style mutiple choice questions
- Test your knowledge with exam-style questions
- Written solutions for all questions





- See your progress through as you progress through each topic area
- Get your average scores for practice questions, topic tests and mock exams
- View all practice question, topic test and mock exam attempts over time
- View historical attempts to analyse your progress over time

Or visit
passfunctionalskills.co.uk

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

1 **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]

2 large cookies is equivalent to $\frac{24}{16} \times 2 = 3$ small cookies.

Therefore, the remaining mix can create $24 - 3 = 21$ small cookies.

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]

Total number of cookies:

Small = $10 \times 24 = 240$, Large = $10 \times 16 = 160$

Number of bags:

Small = $\frac{240}{8} = 30$, Large = $\frac{160}{4} = 40$

Total income:

Small = $30 \times £1.35 = £52.5$, Large = $40 \times £1.35 = £54$.

Total spent on bags:

Small = $£0.02 \times 30 = £0.60$, Large = $£0.02 \times 40 = £0.80$.

Total profit:

Small = $£52.50 - £0.60 = £51.90$, Large = $£54 - £0.80 = £53.20$.

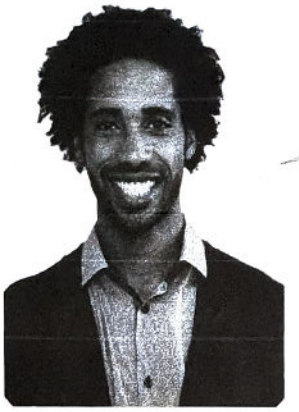
$£53.20 - £51.90 = £1.30$, so Chris is correct.

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]

95g/km ⇒ £120 in Y1, £140 after Y1.

⇒ £120 + (4 × £140) = £680.

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

[1 mark]

£680 − £120 = £560.

£560 ÷ 4 = £140.

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]

Actual fuel efficiency: $65.7 \times 0.2 = 13.14$

$\Rightarrow 65.7 - 13.14 = 52.56$ mpg

Total miles per year: $62 \times 5 \times 46 = 14260$ mi.

Gallons used per year: $\frac{14260}{52.56} = 271.31$ gal.

271.31 gal $\times$ £4.87 per gal $=$ £1321.27

So, Alfie is correct.

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]

D1: 89, D2: 98, D3: 77, D4: 86, D5: 95, D6: 110, D7: 88, D8: 75.

Less More Less Less More More Less Less

5/8 days took under 1½ hours.

5/8 × 120 = 75 out of 120 days.

His estimate is not correct.

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]

128 x 25 = 3200 mins to clean all standard rooms.

40 x 30 = 1200 mins to clean all deluxe rooms.

⇒ 3200 + 1200 = 4400 mins total.

8:30am to 2:00pm is 330 mins.

330 − (2 x 20) = 290 mins from each cleaner.

$\frac{4400}{290}$ = 15.17

⇒ 16 cleaners are needed.

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]**

$(4 \times 18) + (3 \times 8) + (2 \times 11) + (1 \times 9) = 127$ cartons.

$18 + 8 + 11 + 9 + 4 = 50$ rooms.

$\frac{127}{50} = 2.54$ cartons per room.

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]

$0.75 \times 168 =$ 126 rooms per day

$\Rightarrow 126 \times 2.54 =$ 320.04 milk cartons per day.

$320.04 \times 365 =$ 116814.6 cartons per year.

$\frac{116814.6}{240} =$ 486.7275 boxes per year.

$486.7275 \times £12.60 =$ £6132.7665 per year.

No, she is not correct.

16

4 **Transporting hamsters**

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

Ola makes cuboid boxes for transporting hamsters.

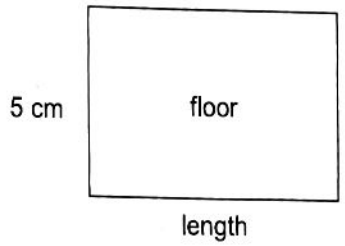
She is making a box to transport **one** 4-week-old Syrian hamster.

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.

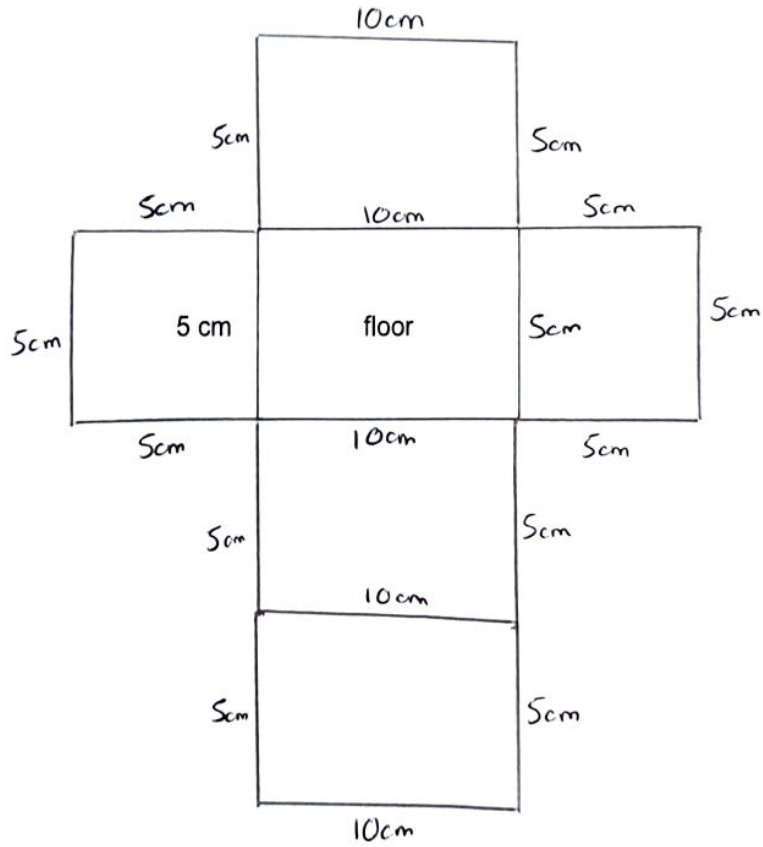
[1 mark]

$\frac{45cm^2}{5cm} = 9cm.$ $\frac{60cm^2}{5cm} = 12cm$ length between 9cm and 12cm. 10cm, for example.

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]

Area of window: $6 \times 4 = 24cm^2$.

$\frac{24}{112} = 0.214$

$\Rightarrow$ 21.4%.

Yes, this window is suitable.

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

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

[3 marks]

$\frac{5}{9}(46°F - 32) = \frac{5}{9} \times 14 = 7.\dot{7}°C \approx 8°C$

$\frac{5}{9}(85°F - 32) = 29.\dot{4}°C \approx 29°C$

Temperature must be between
8°C and 29°C.

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]**

$\frac{2000}{71} = 28.17 \Rightarrow$ 28 Syrian hamsters.

Check your answer.
Show how you have done your check. **[1 mark]**

$28 \times 71 = 1988 < 2000$

$29 \times 71 = 2059 > 2000.$

28 is the maximum.

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]**

$\frac{2000}{48} = 41.\dot{6} \Rightarrow 41$ Dwarf hamsters

$41 - 28 = 13.$

17

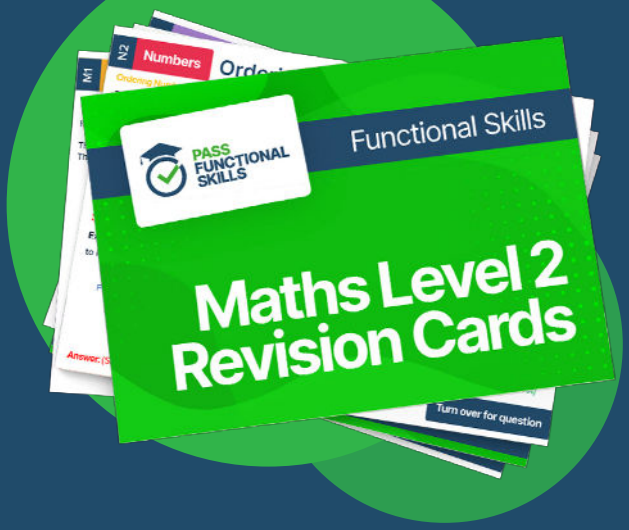
END OF QUESTIONS

There are no questions printed on this page

DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED

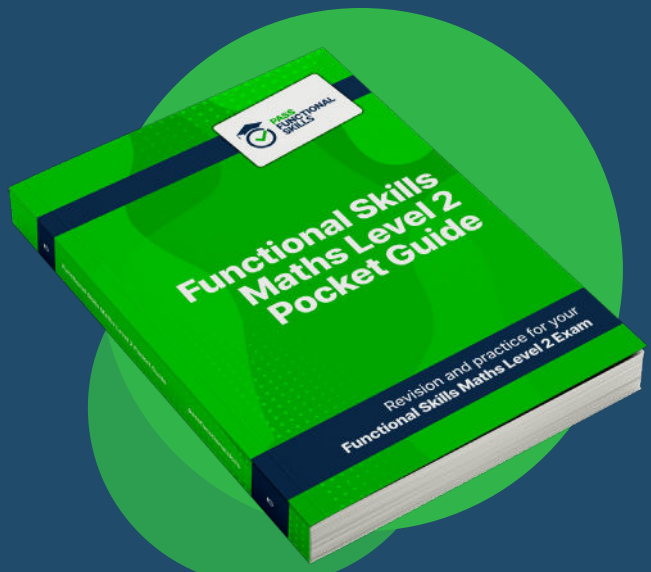
PASS FUNCTIONAL SKILLS

Functional Skills Maths
Level 2 Practice Papers



Functional Skills Maths
Level 2 Revision Cards

Functional Skills English Level 2
Practice Papers & Revision Cards



Functional Skills Maths
Level 2 Pocket Revision Guide

Or visit
passfunctionalskills.co.uk