AQA

Please write clearly in block capitals.

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

Surname _____

Forename(s) _____

Candidate signature _____

Functional Skills Certificate
FUNCTIONAL MATHEMATICS

Level 2

Tuesday 28 February 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).

For Examiner's Use	
Question	Mark
1	
2	
3	
4	
TOTAL	

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 1(a) and 4(b). These questions are indicated with a †.

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

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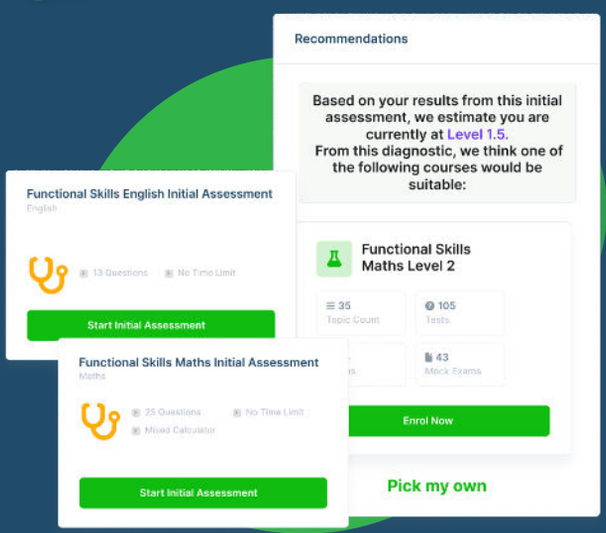
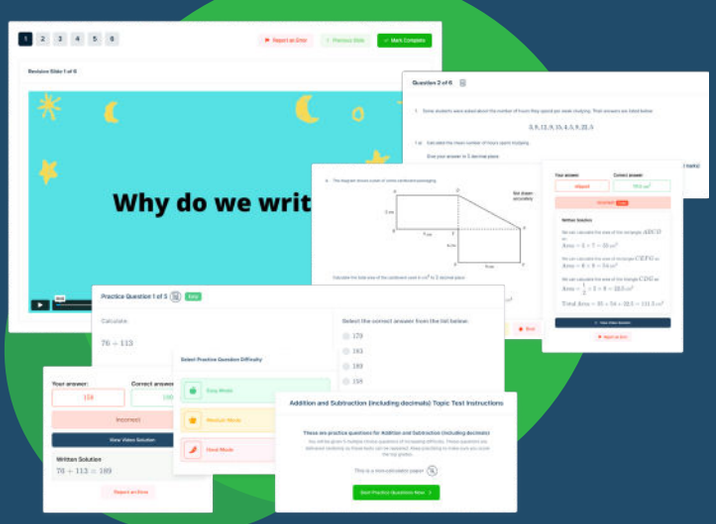
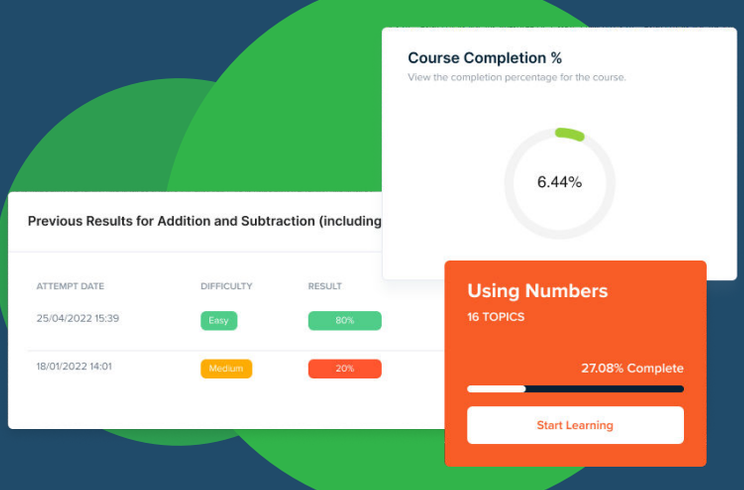
FUNCTIONAL SKILLS ONLINE COURSES



- 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 **Tenpin bowling**

There is a **data sheet** for Tenpin bowling.

I am captain of a tenpin bowling team.

Anna

Anna is playing a game against Ben.

†1 (a) Anna has completed two frames of the game.

1		2	
7	/	8	1

Work out her total score after Frame 2

[2 marks]

F1: 10 + 8 = 18. F2: 8 + 1 = 9.

18 + 9 = 27.

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

[1 mark]

27 − (9 + 8) = 10.

1 (b) Later, Ben has one more frame to play.

1	2	3	4	5	6	7	8	9	10
4 3	8 /	4 5	X	7 2	1 7	5 4	X	6 /	
7	21	30	49	58	66	75			

In Frame 10, Ben knocks over

5 pins with his first ball

3 pins with his second ball.

He says,

"My final score is **more than** 115"

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

[4 marks]

F8: 75 + 10 + 10 = 95.

F9: 95 + 10 + 5 = 110.

F10 = 110 + 5 + 3 = 118.

He is correct.

Question 1 continues on the next page

Anna has to choose a new player for her bowling team.

She can choose either Jamil or Tom.

Jamil and Tom have each played some games against Anna.

Here are their final scores and results.

Jamil	
Final score	**Result**
155	Lost
147	Lost
216	Won
182	Lost
179	Won
177	Lost

Tom	
Final score	**Result**
191	Won
160	Lost
134	Lost
210	Won
182	Lost
202	Won
159	Lost
146	Lost

1 (c)

I have a greater chance of winning against Anna than Jamil does.

Tom

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

[3 marks]

Tom: 3 wins out of 8 games $\Rightarrow \frac{3}{8} = 0.375$

Jamil: 2 wins out of 6 games $\Rightarrow \frac{2}{6} = 0.\dot{3}$

Tom is correct.

1 (d)

On average, my final scores were higher than Tom's.

Jamil

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

[4 marks]

Jamil: $155 + 147 + \ldots + 179 + 177 = 1056.$

$\frac{1056}{6} = 176.$

Tom: $191 + 160 + \ldots + 159 + 146 = 1384.$

$\frac{1384}{8} = 173.$

Jamil is correct.

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2 Sandwiches

I make and sell sandwiches in my shop.

Amir

2 (a) Amir uses 300 grams of spread to make 25 sandwiches.

He buys the spread in 2.5 kg tubs.

He has no spread left.

Next week, Amir wants to make 500 sandwiches.

How many tubs does he need to buy?
You **must** show your working.

[5 marks]

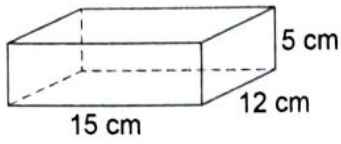
$300g = 0.3kg \left(\frac{300}{1000}\right)$.

$\frac{0.3kg}{25} = 0.012kg$ per sandwich.

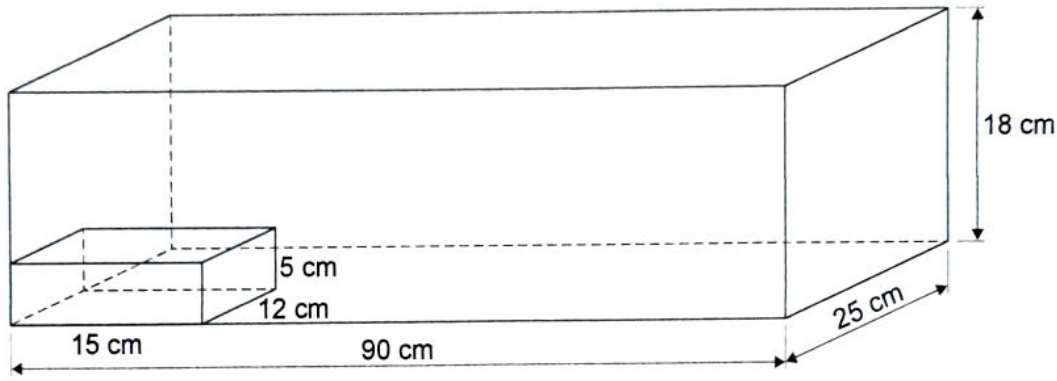
$0.012kg \times 500 = 6kg$ needed.

$\frac{6}{2.5} = 2.4. \Rightarrow$ 3 tubs needed.

2 (b) Amir puts the sandwiches in cuboid boxes.



The boxes of sandwiches are packed in cuboid crates.
The boxes are all packed in the same way, as shown.



Work out the **maximum** number of boxes that can be packed in one crate.
You **must** show your working.

[4 marks]

$\frac{90\text{cm}}{15\text{cm}} = 6$, $\frac{25\text{cm}}{12\text{cm}} = 2.083 \Rightarrow 2$, $\frac{18\text{cm}}{5\text{cm}} = 3.6 \Rightarrow 3$.

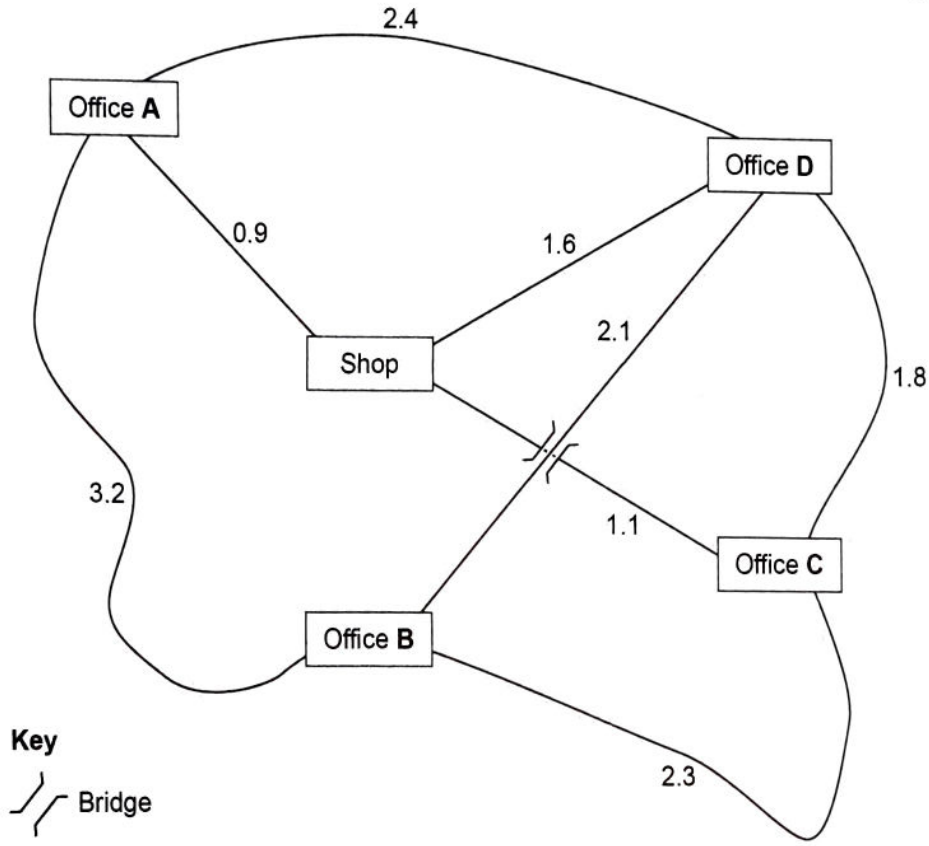
$6 \times 2 \times 3 = 36$.

Amir delivers sandwiches to four offices.

The diagram shows the driving distances between his shop and the offices.

The distances are in miles.

Not drawn accurately



The road between the shop and Office C goes under the bridge.

2 (c) On Monday, Amir drives

Shop ⟶ Office D ⟶ Office C ⟶ Shop

How many miles does he drive?
Circle your answer.

[1 mark]

3.4 4.3 (4.5) 5.4

2 (d) On Tuesday, Amir drives from his shop.

He visits each of the four offices.

He then drives back to the shop.

Work out the shortest possible route.
Include the route and the total distance he drives.

[3 marks]

S → A → D → B → C → S

= 0.9 + 2.4 + 2.1 + 2.3 + 1.1 = 8.8.

S → D → C → B → A → S

= 1.6 + 1.8 + 2.3 + 3.2 + 0.9 = 9.8.

S → A → D → B → C → S is the shortest route.

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3 **Hairdressing salon**

I am opening a hairdressing salon.

Jenny

3 (a) Jenny is designing the salon.

Each sink will need a square space with sides of 50 cm

Each chair will need a circular space with radius 50 cm

She wants

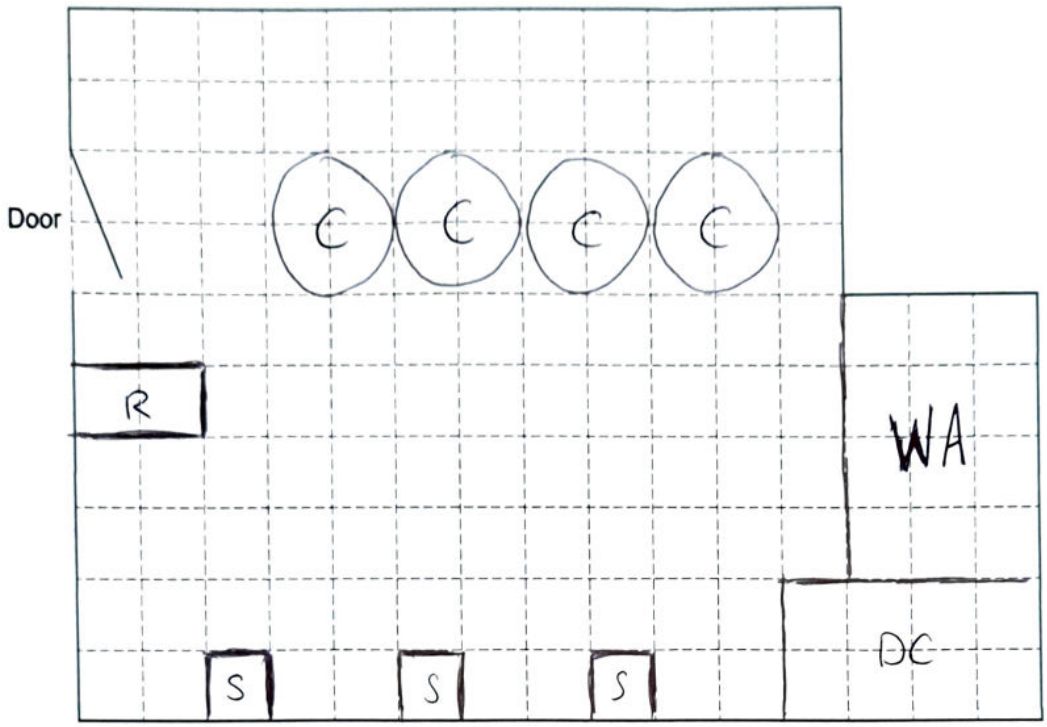
- three sinks against the same wall, at least 1 m apart
- four chairs in a line, each 1 m from one wall
- a rectangular reception desk measuring 1 m by 50 cm
- a rectangular display cabinet measuring 2 m by 1 m
- a rectangular waiting area measuring 2 m by 1.5 m
- the door to be able to open fully.

Show a possible design on the scale drawing opposite.

[6 marks]

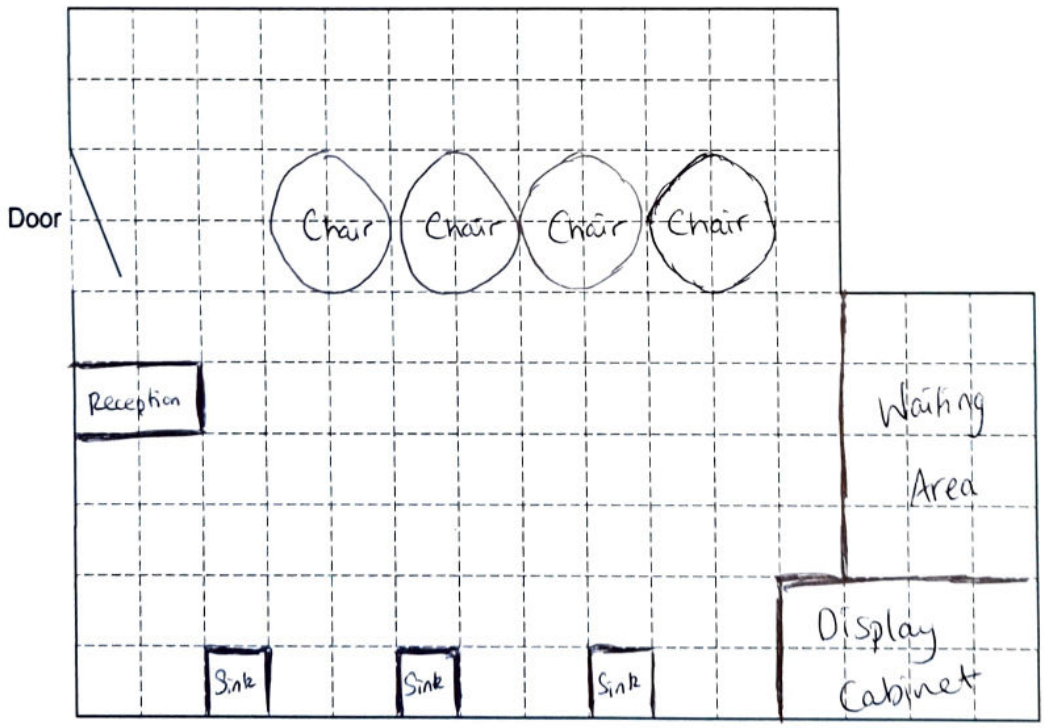
Practise on this diagram.

Scale 2 cm = 1 m



Put your answer on this diagram.

Scale 2 cm = 1 m



Here are the people who work in the salon.

Stylists				Juniors	
Jenny	Craig	Fay	Mia	Erik	Wendy

3 (b) The salon opens six days each week, from Monday to Saturday.

There are two shifts each day.

From Monday to Friday, two stylists and one junior work each shift.

On Saturday, three stylists and one junior work each shift.

Each week

- Jenny, Mia and Erik each work 8 shifts
- Craig and Fay each work 5 shifts
- Craig does **not** work on Saturday
- Wendy works 4 shifts, all in the afternoon
- each **stylist** has at least 1 full day off.

Make a possible rota for one week.
Use the grids opposite.

[4 marks]

Practise on this grid.

	Morning shift				Afternoon shift			
	Stylist 1	Stylist 2	Stylist 3	Junior	Stylist 1	Stylist 2	Stylist 3	Junior
Monday	Craig	Jenny		Erik	Craig	Jenny		Erik
Tuesday	Mia	Jenny		Erik	Mia	Jenny		Erik
Wednesday	Mia	Craig		Erik	Mia	Craig		Wendy
Thursday	Fay	Mia		Erik	Jenny	Craig		Wendy
Friday	Fay	Mia		Erik	Fay	Jenny		Wendy
Saturday	Jenny	Fay	Mia	Erik	Jenny	Fay	Mia	Wendy

Put your answer on this grid.

	Morning shift				Afternoon shift			
	Stylist 1	Stylist 2	Stylist 3	Junior	Stylist 1	Stylist 2	Stylist 3	Junior
Monday	Jenny	Craig		Erik	Jenny	Craig		Erik
Tuesday	Jenny	Mia		Erik	Jenny	Mia		Erik
Wednesday	Mia	Craig		Erik	Mia	Craig		Wendy
Thursday	Mia	Fay		Erik	Jenny	Craig		Wendy
Friday	Mia	Fay		Erik	Jenny	Fay		Wendy
Saturday	Jenny	Mia	Fay	Erik	Jenny	Fay	Mia	Wendy

3 (c) Here are the prices at the salon.

Cut and blow dry	£33
Cut and colour	£60

In the first week the salon has these appointments

35 for a cut and blow dry
15 for a cut and colour.

The table shows the number of appointments for Craig, Fay and Mia.

	Cut and blow dry	**Cut and colour**
Craig	5	2
Fay	4	3
Mia	16	4

The rest of the appointments are for Jenny.

In the first week Jenny will pay

- 10% of the price of their own appointments to Craig, Fay and Mia
- £980 in other wages
- £325 in other costs.

Work out Jenny's profit in the first week.

[6 marks]

C, F + M:

(16 + 4 + 5) x 33 = £825.

£825 x 0.1 = £82.50 lost to commission (C + BD).

(2 + 3 + 4) x 60 = £540 ⇒ £54 lost to commission (C + C).

35 x £33 = £1155 made (from C + BD).

15 x £60 = £900 made (from C + C).

£2055 made altogether.

$$\begin{array}{r} {}^{1}{}^{9}\not{2}\not{0}{}^{1}55 \\ -\ 980 \\ \hline 1075 \end{array} \Rightarrow \begin{array}{r} {}^{9}\not{1}\not{0}75 \\ -\ 325 \\ \hline 750 \end{array} \Rightarrow \begin{array}{r} {}^{6}\not{7}{}^{1}\not{8}{}^{1}0 \\ -\ 54 \\ \hline 696 \end{array}$$

$$\begin{array}{r} {}^{6}\not{9}{}^{5}\not{6}.00 \\ -\ 82.50 \\ \hline 613.50 \end{array}$$

£613.50 remaining.

16

4 **Electricity**

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

4 (a) Joe has an electric fire with three settings.

Setting	High	Medium	Low
Power	2 kW	1.5 kW	1 kW

Last week, he used the fire on

High for 6 hours on 1 night
Medium for 5 hours on each of 4 nights
Low for 3 hours on each of 2 nights.

Electricity costs 15.5 pence per unit.

Joe says,

"Last week, the cost of electricity for using the fire was less than £10"

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

[6 marks]

6 hr x 2kW = 12 kWh.

4 x 5h x 1.5kW = 30 kWh.

2 x 3h x 1kW = 6 kWh

12 + 30 + 6 = 48 kWh total.

48 x £0.155 = £7.44.

Yes, he is correct.

Joe has a lamp that uses one light bulb.

†4 (b) An ordinary 100 W bulb

- lasts for 6 months
- costs 89 pence.

How much will Joe pay to buy ordinary 100 W bulbs for his lamp for **4 years**?

[2 marks]

4 years = 48 months. $\frac{48}{6} = 8$ bulbs needed.

8 × £0.89 = £7.12.

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

[1 mark]

£7.12 ÷ 89p = 8 bulbs.

8bulbs × 6 months per bulb gives 48 months, or 4 years.

Question 4 continues on the next page

4 (c) Joe looks at the cost of buying and using ordinary 100 W bulbs or a low energy bulb for the next **4 years**.

He makes these notes.

The lamp is switched on for 240 hours **each year**.

Electricity costs 15.5 pence per unit.

A low energy bulb

- lasts for 4 years
- costs £13.88
- uses 20% of the number of units of electricity used by an ordinary 100 W bulb.

He says,

"The total cost is less if I use a low energy bulb."

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

[8 marks]

100W bulbs: 100 W = 0.1 kW.

0.1 kW x 240 hr x 4 = 96 kWh over 4 years

96 x 0.155 = £14.88 over 4 years.

£14.88 + £7.12 = £22 total over 4 years.

L-E bulb:

0.2 x £14.88 = £2.976 over 4 years

£13.88 + £2.976 ≈ £16.86 total over 4 years.

Yes, he is correct.

END OF QUESTIONS

17

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ANSWER IN THE SPACES PROVIDED

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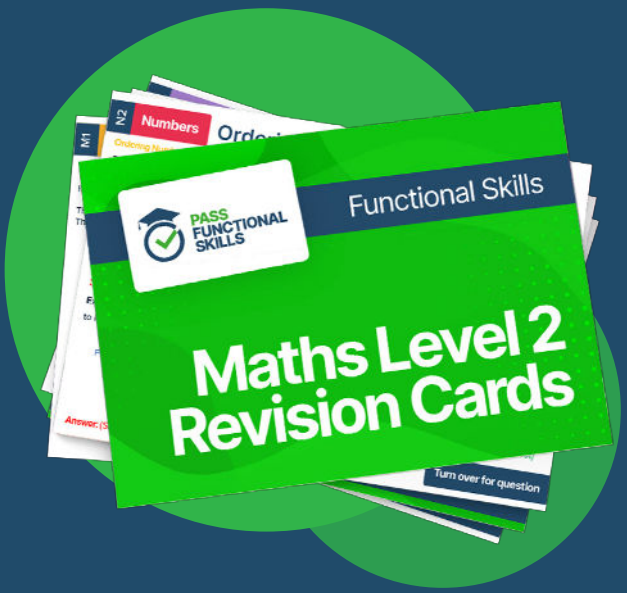
Level 2 Practice Papers



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