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NCFE Level 2 Functional Skills Qualification in Mathematics (603/5060/X)

Paper number:	Practice P001269
Section B:	Calculator Test

Time allowed: 1 hour 30 minutes

Learner instructions

- Answer **all** questions.
- Read each question carefully.
- Write your answers in the spaces provided.
- Show your working, as marks may be awarded for working.
- State units in your answers, where appropriate.
- Check your work.
- Use $\pi = 3.14$

Learner information

- Section B contains **Activities 2, 3** and **4.**
- The maximum mark for this section is **45.**
- The marks available for **each** question are shown in brackets.

Resources

You will need a:

- pen, with black or blue ink
- pencil and eraser
- 30 cm ruler
- protractor
- calculator.

If extra pages are used, please make sure your name and centre name are on them and they are securely fastened to this booklet.

Please complete the details below clearly and in BLOCK CAPITALS.

Learner name _____

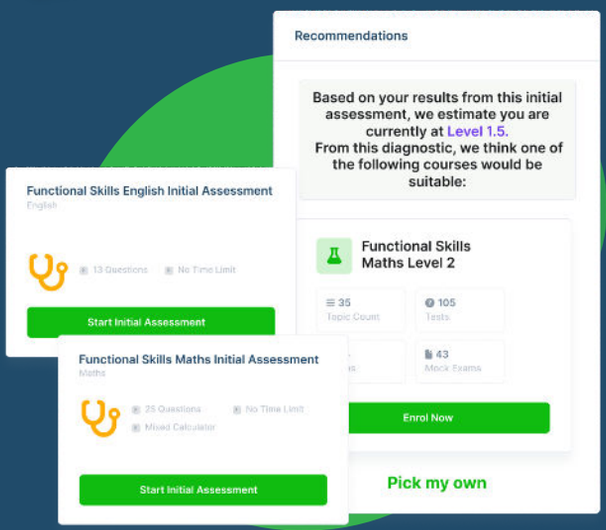
Centre name _____

Learner number | | Centre number | |

Do not turn over until the invigilator tells you to do so.

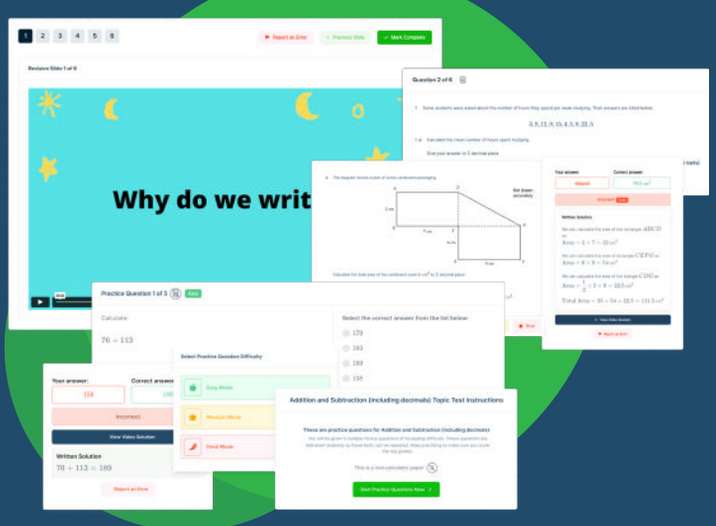
PASS FUNCTIONAL SKILLS

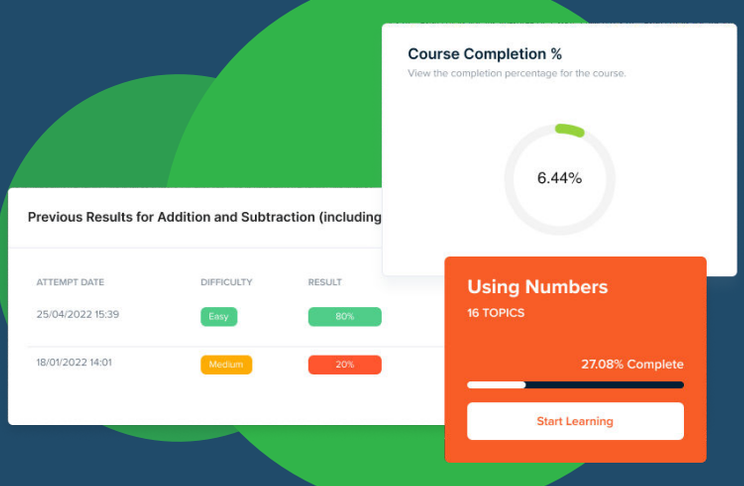
FUNCTIONAL SKILLS ONLINE COURSES



- 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
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Activity 2: Films

2 (a) Liam downloads films from the internet.

The table shows the number of films he downloaded last month.

	Action	Comedy	Sci-Fi	Total
Less than 1 hour long	5	2	4	11
Exactly 1 hour long	2	4	6	12
More than 1 hour long	1	1	3	5
Total	8	7	13	28

He chooses one of these films at random.

What is the probability that the film he chooses is an action film that is at least 1 hour long?

[2 marks]

$\frac{2+1}{28}$

Your answer: $\frac{3}{28}$.

2 (b) Liam thinks he might watch either Rainbow Prism or The Infinity Zone.

He looks at the scores given by different newspapers.
The scores are out of 100

	Rainbow Prism	The Infinity Zone
Daily Times	75	75
London Post	63	68
City Observer	52	not scored
Newcastle Daily	38	50
Entertainment	70	74
Britain Today	83	65
This Week	60	79
Northern Gazette	41	40
Sunday Extra	52	63

Which of the two films would you suggest Liam watches next?
Use **two** appropriate statistical measures to explain your answer.

[3 marks]

RP: $\frac{75 + 63 + \ldots + 41 + 52}{9} = 59.\dot{3}$ (mean)

TIZ: $\frac{75 + 68 + \ldots + 40 + 63}{8} = 64.25$ (mean).

Median:

RP: 60 , TIZ: $\frac{65+68}{2} = 66.5$.

"The Infinity Zone" has a higher mean and median mark.

Your answer: The Infinity Zone.

2 (c) Screen images are made up of units of light called pixels.

Pixels per square inch (PPI^2) is a measure of image quality.
The higher the pixels per square inch, the better the image quality.

$$PPI^2 = \frac{N}{A}$$

Where: N is the number of pixels
A is the area of the screen in square inches

Liam's old screen has a PPI^2 value of 9800
He wants to buy a new screen with a better image quality.

Liam sees a rectangular screen that has:

- a width of 101.6 cm
- width : height ratio of 16 : 9
- 8.28 million pixels

He works out that this will have a better image quality than his old screen.

Is Liam correct? Show your working.

Use the conversion: 1 inch = 2.54 cm

[4 marks]

$\frac{101.6}{16} \times 9 = 57.15$ cm (height.)

$\frac{101.6}{2.54} = 40''$ (width.), $\frac{57.15}{2.54} = 22.5''$ (height.)

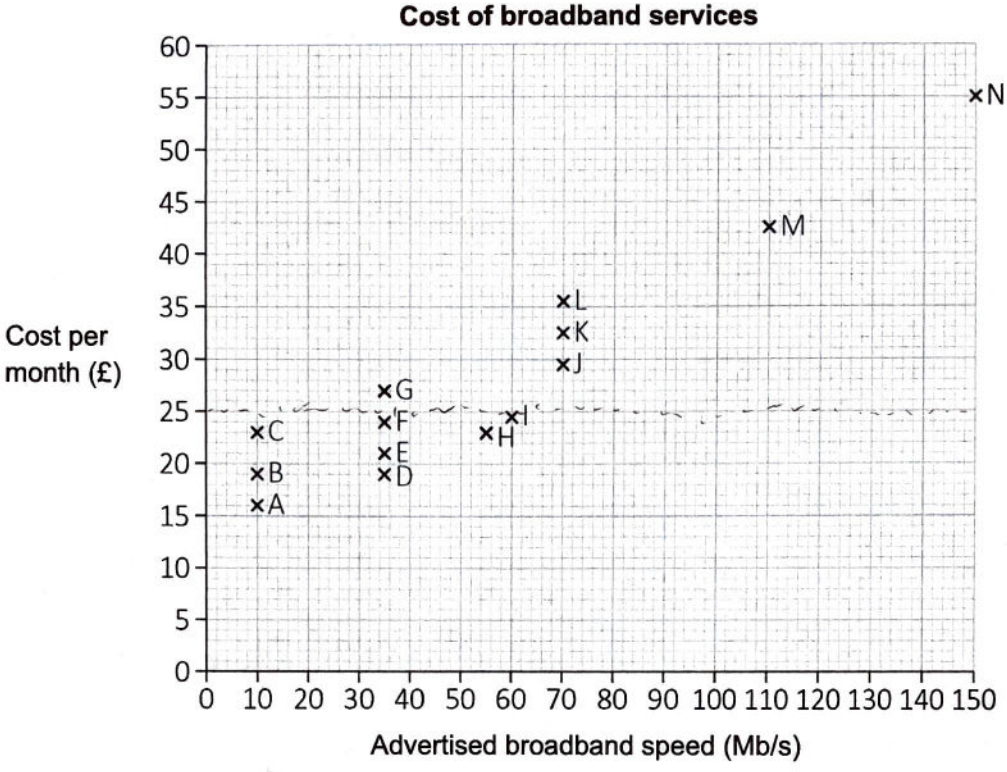
$40 \times 22.5 = 900$ sq. in.

$PPI^2 = \frac{8280000}{900} = 9200$

Your answer: No, he is incorrect.

2 (d) Liam searches online for a choice of broadband services.

He finds this graph:



Broadband speed is measured in Mb/s (Megabits per second).

The lettered crosses in the graph represent the different services.

What is the modal speed of these broadband services?

[1 mark]

Your answer: 35. **Mb/s**

2 (e) Using the graph from **2 (d)**, what percentage of these broadband services cost over £25 per month?

Give your answer to 2 decimal places.

[2 marks]

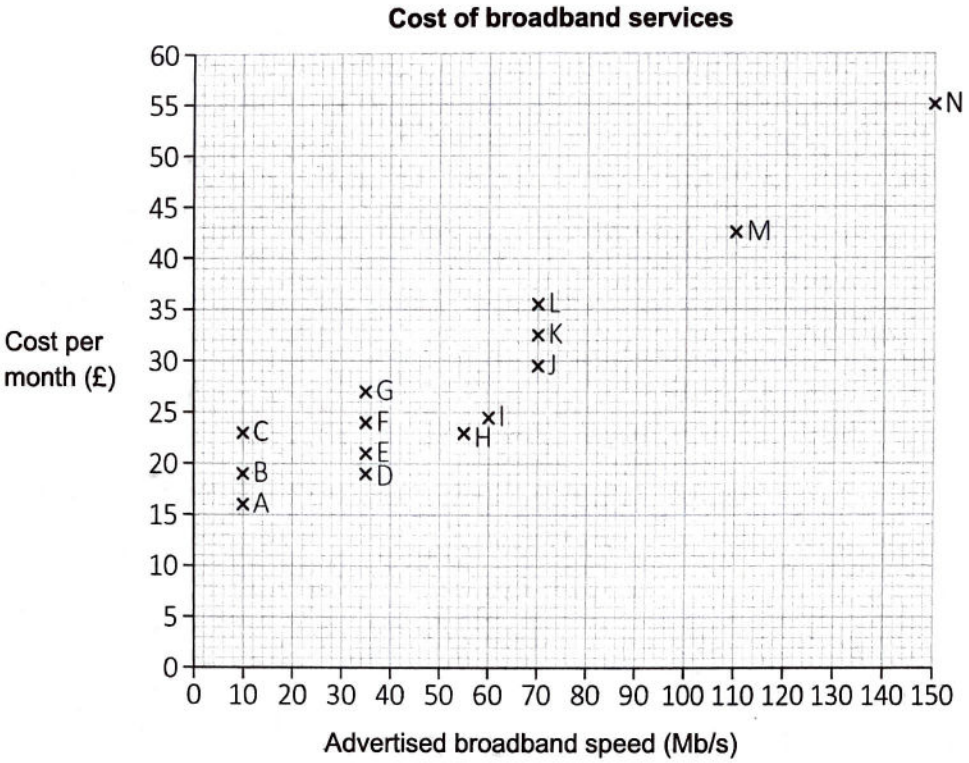
$\frac{6}{14} = \frac{3}{7} = 0.4286$

$= 42.86\%$

Your answer: 42.86 %

Please turn over

2 (f) This is the graph from **2 (d)**.



The actual speed of a broadband service depends on how far the customer's house is from the nearest connection box.

Distance from house to connection box (to the nearest m)	Percentage of advertised speed
0-100 m	100%
101-500 m	85%
501-1000 m	70%

Liam's house is 350 m from the connection box.

Liam wants to be able to download a 7000 Mb film in less than 2 minutes.

What is the cheapest broadband service he can choose?
Show your working.

[3 marks]

350m → 85% = 0.85

$\frac{7000\text{Mb}}{2\text{min}} = \frac{7000\text{Mb}}{120\text{sec.}} = 58.\dot{3}\ \text{Mb/s}$

$\frac{58.3}{0.85} = 68.63\ \text{Mb/s}$ needed.

Choose Service J.

Your answer: Service J.

[Total marks: 15]

Please turn over

Activity 3: Building a pond

3 (a) Aria is involved in a community project group.

The group are planning to build a pond in the garden of the local hospital.
The pond has a path around it.

On a scale plan, the width of the path is 6.7 cm

The scale used on the plan is 1 : 25

Calculate the actual width of the path.

[1 mark]

6.7 x 25 = 167.5 cm

Your answer: 167.5 **cm**

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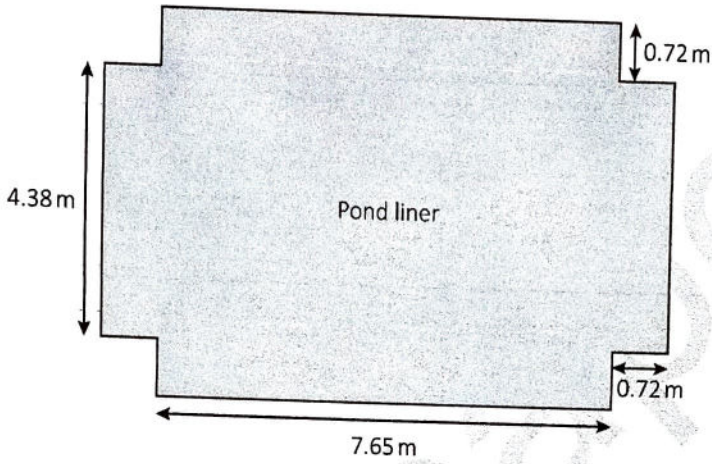
Please turn over for the next question.

3 (b) The pond will be a cuboid. It will be lined with a sheet of plastic pond liner. The pond liner covers the bottom and sides of the pond.

The pond liner needs to be cut to this shape to exactly fit in to the pond without any overlaps.

The dimensions of the pond liner are shown in this diagram:



Sheets of pond liner are available in these sizes:

Pond liner	Width	Length	Price
A	4.85 m	8.3 m	£76
B	5.45 m	8.7 m	£96
C	5.85 m	9.1 m	£130
D	6.25 m	9.5 m	£151
E	6.65 m	9.9 m	£172

Aria needs to buy the cheapest pond liner that is big enough to fit the pond.

Which pond liner should she buy?
Show your working.

[3 marks]

7.65 + (2 × 0.72) = 9.09 m ~~wide~~ long

4.38 + (2 × 0.72) = 5.82 m ~~long~~ wide

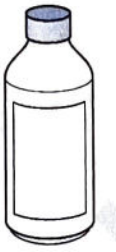
Pond liner C.

Your answer: Pond liner C.

3 (c) The group ask Aria to buy chemical treatment for the pond water to make it suitable for fish.

One bottle contains enough chemical to treat 1300 gallons of water.

$1\ m^3 = 220$ gallons



Aria adds water to the pond until it is 92% full.

How many bottles of chemical treatment will she need?
Show your working.

[4 marks]

$7.65m \times 4.38m \times 0.72m = 24.12504\ m^3$

$24.12504 \times 0.92 = 22.195\ m^3$ water.

$22.195 \times 220 = 4882.91$ gallons.

$\frac{4882.91}{1300} = 3.756$ bottles $\Rightarrow$ 4 needed

Your answer: 4 **bottles**

3 (d) Aria needs to work out how many fish can be put in the pond.
She wants to have both Koi fish and Goldfish.

The number of fish is based on the **surface area** of the water in the pond.

Koi fish need 1.2 m^2 each.
Goldfish need 0.6 m^2 each.

Aria wants to have a mixture of Koi fish and Goldfish in the ratio 1 : 4

What is the maximum number of Koi fish **and** Goldfish that Aria can put in the pond, if she keeps the ratio 1 : 4?

[3 marks]

Surface Area: $7.65m \times 4.38m = 33.507m^2$.

x Koi $\Rightarrow$ $4x$ Goldfish.

$1.2x + (0.6 \times 4x) = 3.6x$.

$\frac{33.507}{3.6} = x = 9.3075$

$\Rightarrow$ 9 Koi, 36 Goldfish

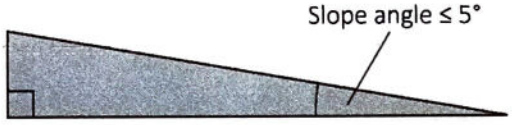
Your answer:

9	**Koi fish**
36	**Goldfish**

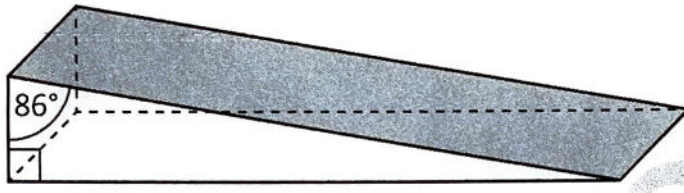
Please turn over

3 (e) The group need to build a ramp between the hospital door and the gardens.

The angle of the slope of the ramp must not be more than 5°



This is a diagram of the ramp:



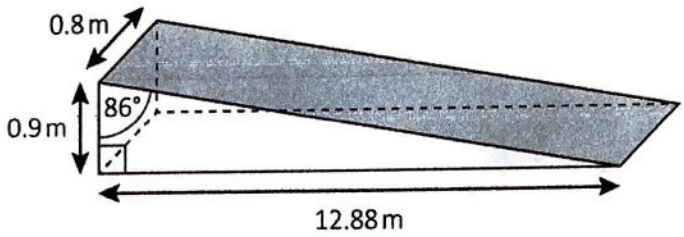
Calculate the angle of the slope.

[1 mark]

$180° - (90° + 86°) = 4°$.

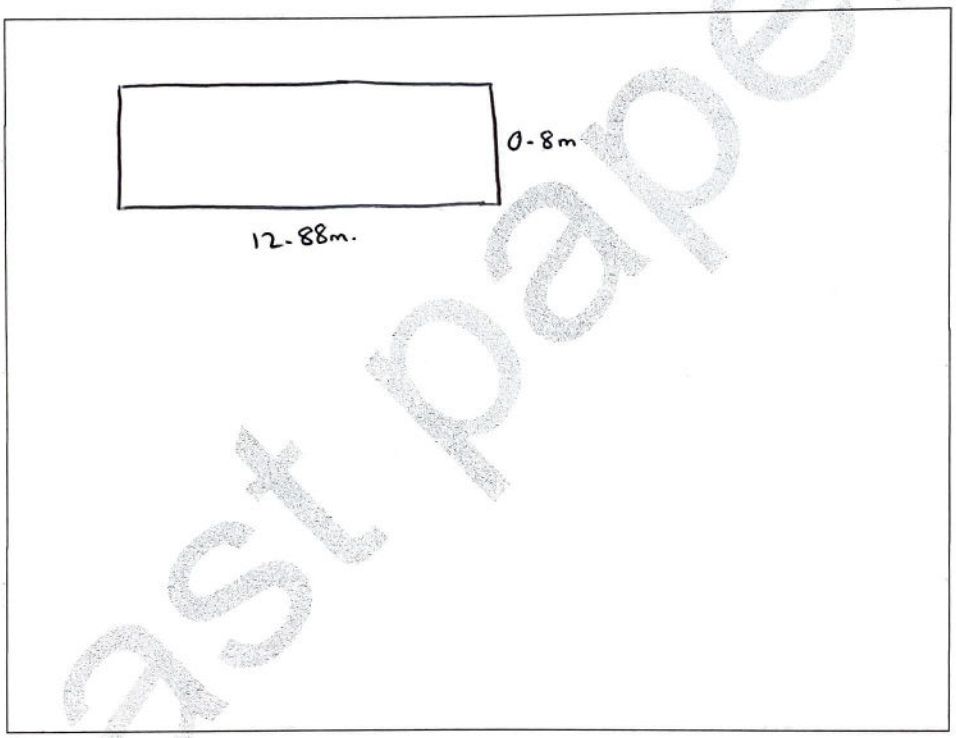
Your answer: 4 °

3 (f) This diagram shows the measurements of the ramp:



Draw the plan view of the ramp as seen from above.
Include the dimensions on your drawing.

[1 mark]



Please turn over

3 (g) The group need to order enough concrete to make the ramp.

The formula to find the volume of a triangular prism is: $\frac{L \times H \times W}{2}$

Where:

L is length
H is vertical height
W is width

Calculate the volume of concrete that is needed to build the ramp.

[2 marks]

$\frac{0.9 \times 0.8 \times 12.88}{2} = 4.6368 m^3$

Your answer: 4.64 **m^3**

[Total marks: 15]

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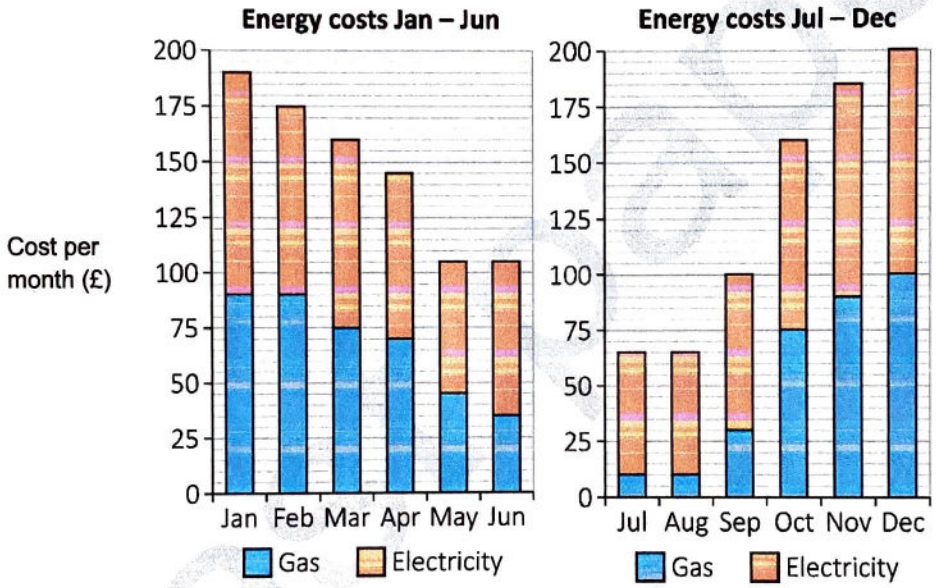
Activity 4: Saving energy costs

4 (a) Eli needs to complete a project on energy costs for his college course.

Eli's family currently use Xpower for gas and electricity.
They pay monthly by direct debit.

Xpower uses the **median** monthly cost for January to June to set the amount of their monthly direct debit payments for July to December.

The graphs show their energy costs for last year.



Eli works out that they have paid too much between July and December.

Calculate the percentage by which they have overpaid.

[4 marks]

Jan-Jun: $\frac{£160 + £145}{2} = £152.50$

$£152.50 \times 6 = £915.$

Jul - Dec: $£65 + £65 + £100 + £160 + £185 + £200$

$= £775.$

$\frac{915 - 775}{775} \times 100 = 18.06\%$

Your answer: 18.06 %

Please turn over

4 (b) This is Eli's electricity bill for the first quarter of this year:

Total electricity used	£211.90
Dual fuel discount	–£14.90
VAT	£9.85
Total including VAT	£206.85

VAT is calculated after discount.

What percentage has been used to calculate the VAT?

[3 marks]

£211.90 − £14.90 = £197.

$\frac{£9.85}{£197} \times 100 = 5\%$.

Your answer: 5 %

4 (c) Xpower offer a Loyalty Plan.
The formula Xpower use to work out the cost for the Loyalty Plan is:

$$(D \times 365) + (P \times G)$$

Where:

D is daily charge (in £)
P is price per kWh (in £)
G is gas used per year (in kWh)

For this plan the charges are:

- Daily charge: 32p
- Price per kWh: 3.10p

Last year Eli's family used 17563kWh of gas.
This cost £719.38

Should Eli's family choose the Loyalty Plan for their gas?
Show your working.

[2 marks]

$(0.32 \times 365) + (0.031 \times 17563) = £661.253$

The Loyalty Plan is cheaper.

Your answer: Yes.

4 (d) The average UK gas bill is 3.875 times more than the average UK electricity bill.

[2 marks]

(i) Write 3.875 as an improper fraction.

$\frac{3875}{1000} = \frac{31}{8}$

(ii) Write 3.875 as a percentage.

387.5 %.

4 (e) Eli looks for information on the cost of leaving gadgets on standby when they are not being used.

Eli's gadgets are a TV, computer, printer, phone charger and two games consoles.

He finds several reports stating how much electricity a gadget uses when left on standby, but they do not agree.

Annual saving per gadget	Number of reports
£0 - £4.99	1
£5 - £9.99	4
£10 - £14.99	5
£15 - £19.99	2

Use an estimate of the mean to find how much money Eli could save if he switched off his gadgets, instead of leaving them on standby.

[4 marks]

(£2·50 × 1) + (£7·50 × 4) + (£12·50 × 5) + (£17·50 × 2)

= £130.

1 + 4 + 5 + 2 = 12.

$\frac{£130}{12}$ = £10·83̇ per gadget.

£10·83̇ × 6 gadgets = £65

Your answer: £ 65.

[Total marks: 15]

This is the end of the assessment.

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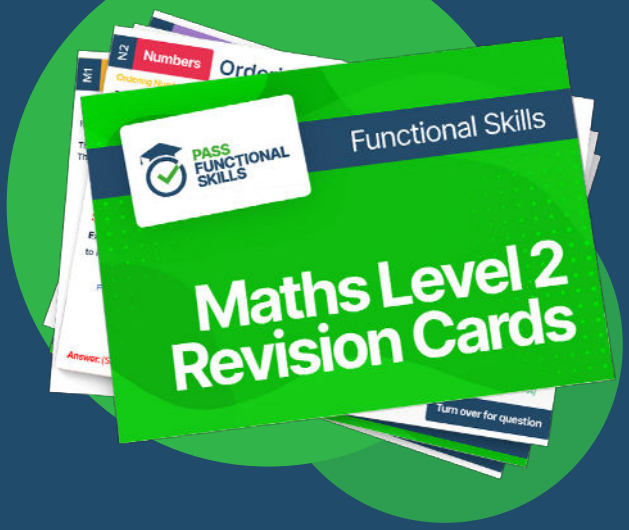
Level 2 Practice Papers



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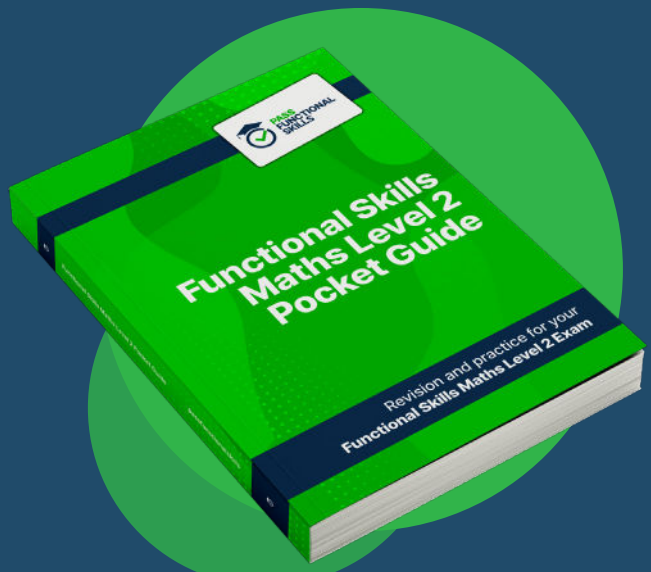

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