



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

Paper number: Practice P001270
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 is 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.

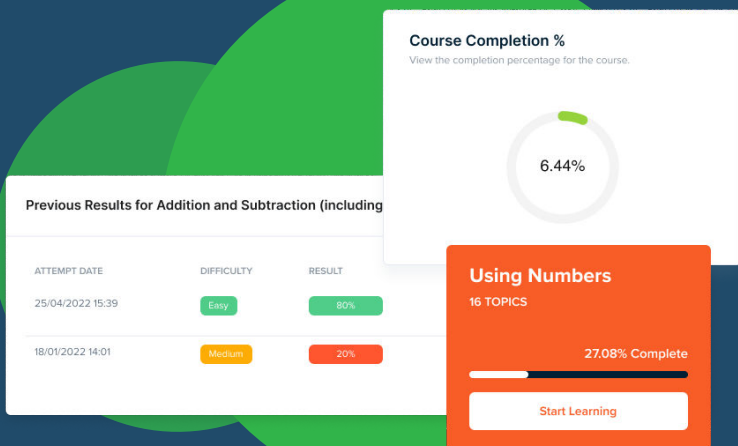
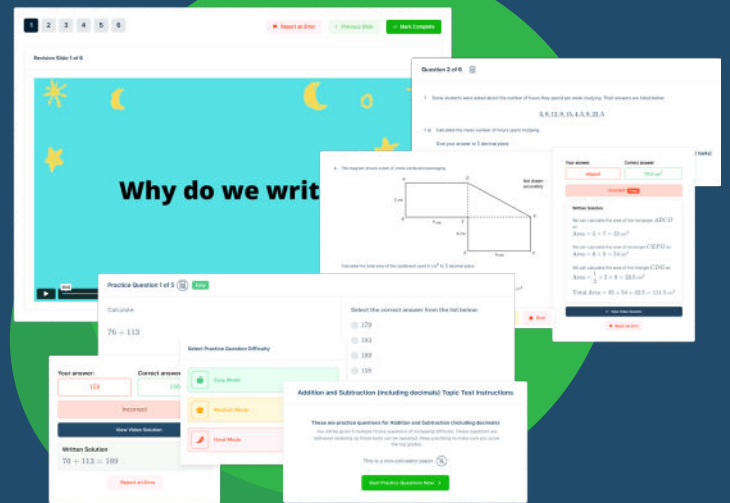


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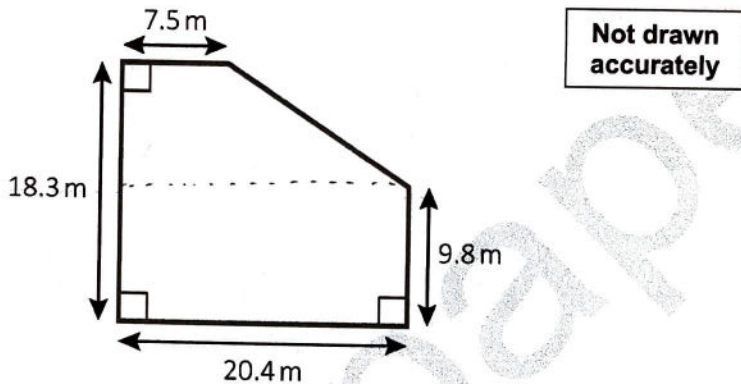
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Activity 2: Allotment

- 2 (a) An allotment is a piece of land that people can rent to grow fruit, flowers and vegetables.

A residents' association has an allotment so that people can grow their own vegetables.

This is a plan of the allotment:



What is the area of the allotment?

[3 marks]

$$20.4 \times 9.8 = 199.92 \text{ m}^2$$

$$\frac{1}{2} \times (20.4 + 7.5) \times (18.3 - 9.8) = 118.575 \text{ m}^2$$

$$199.92 + 118.575 =$$

Your answer:

318.495

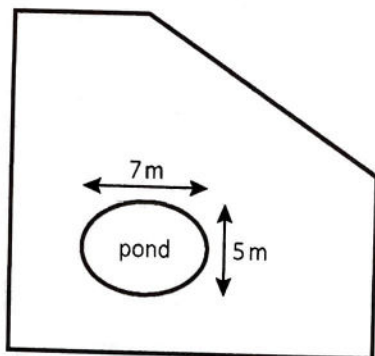
m²

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2 (b) There is an oval pond in the allotment.

The pond is 7 m long, 5 m wide and 80 cm deep.

The pond is to be filled in with soil.



Not drawn
accurately

The formula to find the volume (in m^3) of the pond is: $\pi \times \frac{L}{2} \times \frac{W}{2} \times D$

Where:

L is the length (in m)

W is the width (in m)

D is the depth (in m)

Use $\pi = 3.14$

Soil can be bought in two sizes of bag.

Bag of soil	Volume of soil	Price per bag
A	0.9 m ³	£74
B	1.5 m ³	£110

The pond should be filled as cheaply as possible.

How much will it cost? Show your working.

[4 marks]

$$3.14 \times \frac{7}{2} \times \frac{5}{2} \times 0.8 = 21.98 \text{ m}^3$$

Bag A: $\frac{21.98}{0.9} \times £74 = \text{round to 25} \quad \text{~~£18524~~ } £1850$

Bag B: $\frac{21.98}{1.5} \times £110 = \text{round to 15} \quad \text{~~£1650~~ } £1650$

Use 15 bags of Bag B.

Your answer:

£ 1650

Please turn over

- 2 (c) If 3 people work together, it would take them 8 hours to fill in the pond.

How long would it take 5 people working at the same rate?

[2 marks]

$$3 \times 8 = 24 \text{ hours total}$$

$$\frac{24}{5} = 4.8 \text{ hours.}$$

Your answer:

4.8 hours.

- 2 (d) Asif wants to grow potatoes.

The **GrowPotatoes** website gives these instructions for planting potatoes:

Potatoes should be planted in rows.

There must be 75 cm between the rows,
and 50 cm between each plant in a row.

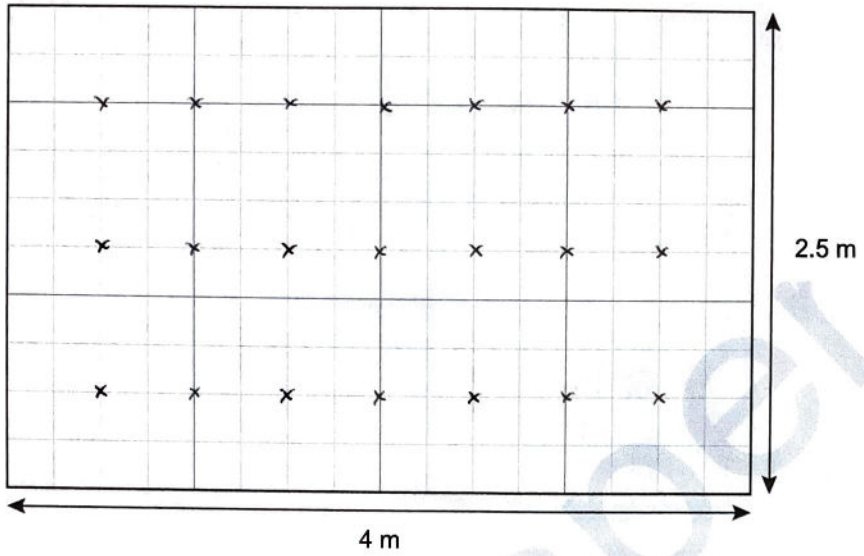
There should be a gap of at least 50 cm
between the plants and the edge of the plot.

The space for planting potatoes is a rectangle measuring 4 m by 2.5 m

Use the scale plan on the next page to show how the potato plants should be arranged to fit in the most potato plants.

Draw a cross (+) to mark the position for each plant.

[2 marks]



Please turn over

- 2 (e) Asif finds some trial results about two types of potato, Cara and Desiree.

Trial number	Yield (per potato plant)	
	Cara	Desiree
1	1.65 kg	1.25 kg
2	1.42 kg	1.42 kg
3	1.88 kg	2.10 kg
4	1.73 kg	1.76 kg
5	1.97 kg	

Yield is the weight of potatoes that can be produced from one potato plant.

Asif wants to plant the type of potato with the higher yield.
He will grow 20 potato plants.

Use the trial data to recommend which type of potato Asif should plant
and estimate the expected total weight of potatoes, in pounds, that he will get.

Use the conversion: 1 kg = 2.2 pounds

[4 marks]

Mean:

Cara: $\frac{1.65 + 1.42 + 1.88 + 1.73 + 1.97}{5} = 1.73 \text{ kg}$

Desiree: $\frac{1.25 + 1.42 + 2.1 + 1.76}{4} = 1.6325 \text{ kg.}$

Median:

Cara: 1.73 kg

Desiree: $\frac{1.42 + 1.76}{2} = 1.59 \text{ kg.}$

Use Cara potatoes

$20 \times 1.73 \times 2.2 = 76.12 \text{ lbs}$

Your answer:

Type of potato

Cara

76.12

pounds

[Total marks: 15]

Activity 3: Fruit juice

- 3 (a) Pete is a catering student.
He has been given a project testing fruit juicers.

Pete is testing the SuperJuicer and the Blitz-It juicer.

Pete juices 100 g of strawberries in the Blitz-It juicer.
He repeats this 7 times.

Test number	Volume of juice
1	73 ml
2	66 ml
3	70 ml
4	65 ml
5	67 ml
6	71 ml
7	72 ml

Calculate the median volume of strawberry juice produced by the Blitz-It juicer.

[1 mark]

Your answer:

70

ml

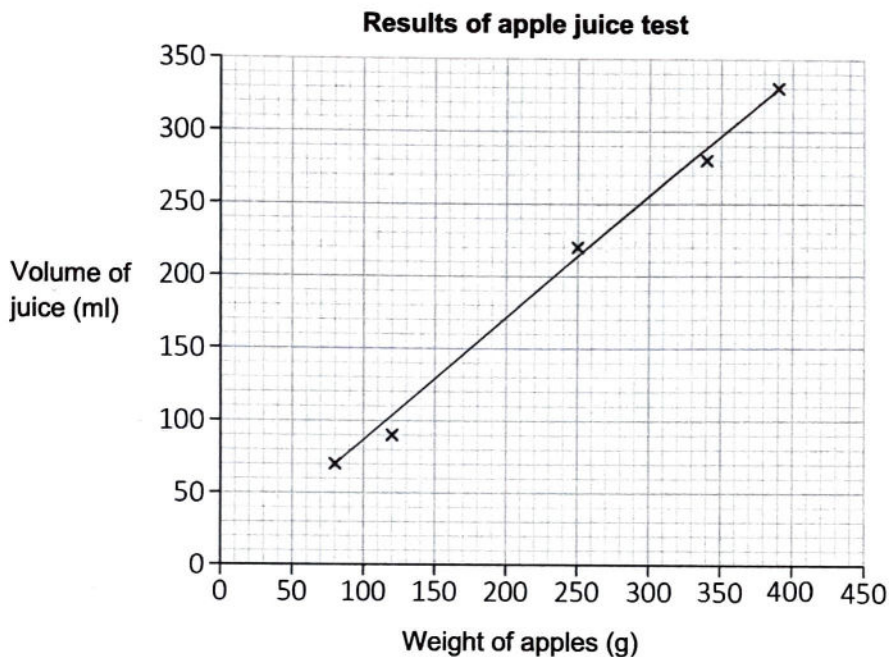
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3 (b) Pete tests the SuperJuicer.

The manufacturer claims that 300 g of apples will produce $\frac{2}{5}$ of a pint of juice.

Pete tests this claim by juicing different weights of apples and measuring the amounts of juice they produce.

He uses his results to draw this scatter diagram:



Is the manufacturer's claim correct? Show how you decide.

Use the conversion: 1 pint = 568 ml

[3 marks]

$$300\text{g} \rightarrow 255\text{ml}.$$

$$\frac{255}{568} = 0.449 \text{ pints.}$$

$$0.449 > \frac{2}{5}.$$

Yes, the claim is fair, ~~at~~ 300g produces
at least $\frac{2}{5}$ of a pint.

Your answer:

Yes.

Please turn over

- 3 (c) The Blitz-It juicer's information states that the weight of juice produced from oranges is around 30% of the weight of the fruit.

If Pete wants to produce 150 g of juice, what weight of oranges should he use?

[2 marks]

$$\frac{150\text{g}}{0.3} = 500\text{g}.$$

Your answer:

500

g

- 3 (d) Pete asks a group of college students which machine's juice they prefer.

This table shows their responses:

Age group	SuperJuicer	Blitz-It juicer
Under 19 years old	16	4
19+ years old	17	13

A student from the group is chosen at random.

What is the probability that the student is under 19 and preferred juice from Blitz-It juicer?

[2 marks]

$$16 + 4 + 17 + 13 = 50$$

$$\frac{4}{50} = 0.08.$$

Your answer:

0.08

3 (e)

Pete makes a smoothie using juice from pineapples and mangoes.

He wants the volume of pineapple juice to mango juice to be as close as possible to a 3 : 2 ratio.

Typical volumes of juice produced from 1 fruit are:

Pineapple	0.2 litres
Mango	0.08 litres

Costs of fruit at the local supermarket are:

Type of fruit	Price for 1 fruit
Pineapple	£1.50
Mango	65p

What is the cost of the fruit that Pete needs to buy to make 8 litres of smoothie?

[5 marks]

$$3+2=5 \text{ parts. } \Rightarrow \frac{3}{5} \times 8L = 4.8L \text{ (pineapple) needed.}$$

$$\frac{2}{5} \times 8L = 3.2L \text{ (mango) needed.}$$

$$\frac{4.8}{0.2} = 24 \text{ pineapples needed.}$$

$$\frac{3.2}{0.08} = 40 \text{ mangoes needed.}$$

$$(24 \times £1.50) + (40 \times £0.65) \\ = £62$$

Your answer:

£ 62

3 (f)

When Pete goes to buy the fruit, he finds that pineapples have increased in price to £1.75 each.

By what percentage has the price of pineapples increased?
Give your answer to 1 decimal place.

[2 marks]

$$\frac{\pounds 1.75 - \pounds 1.50}{\pounds 1.50} = 0.1\dot{6}$$
$$\Rightarrow 16.\dot{6} \%$$

Your answer:

16.7

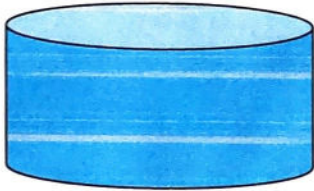
%

[Total marks: 15]

Activity 4: Working in the theatre

- 4 (a)** Jan is an apprentice in a theatre.
She needs to plan the layout of the stage for the next play.

A prop is an object used on stage.
One of the props is a cylinder with radius 1.5 m



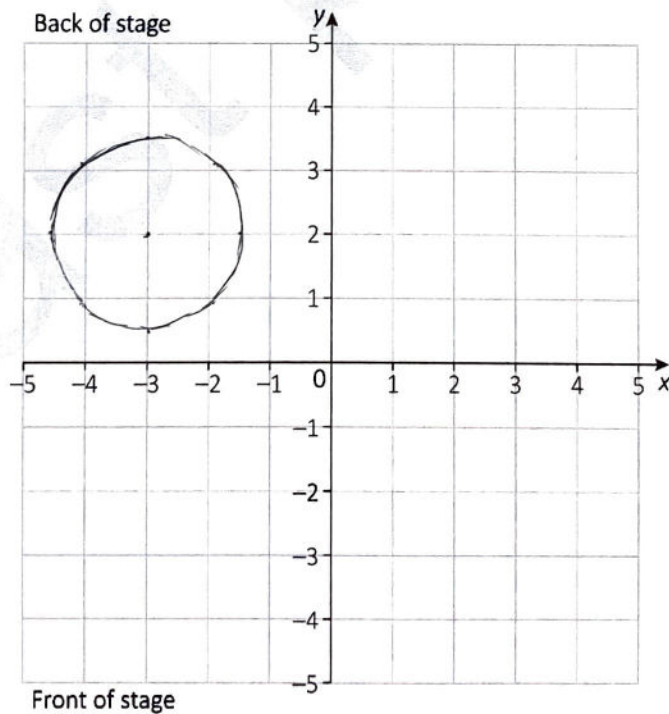
Jan uses a coordinate grid to plan where to put props on the stage.

Each small square on the grid represents a 1 m by 1 m square on the real stage.

She wants the centre of the cylinder to be at $(-3, 2)$

On the grid, draw a plan view of the cylinder in this position.

[2 marks]



Please turn over

4 (b) The cylinder has radius 1.5 m and height 1.25 m

Calculate the volume of the cylinder in m^3

Give your answer to 1 decimal place.

Use $\pi = 3.14$

[2 marks]

$$\pi \times 1.5^2 \times 1.25 = 8.83125 \text{ m}^3$$

Your answer:

8.8

m^3

4 (c) Jan needs to cover a ball with glitter.

The ball's radius is 60 cm

The formula to find the surface area (A) of a sphere is: $A = 4 \pi r^2$

Jan buys the glitter in bottles.

She needs to use 300 g of glitter per square metre.

Each bottle holds 254 g of glitter.

Calculate the number of bottles of glitter needed to cover the sphere.
Show your working.

Use $\pi = 3.14$

[4 marks]

$$60 \text{ cm} = 0.6 \text{ m.}$$

$$A = 4 \times 3.14 \times 0.6^2 = 4.5216 \text{ m}^2.$$

$$4.5216 \times 300 \text{ g} = 1356.48 \text{ g glitter needed.}$$

$$\frac{1356.48}{254} = 5.34 \text{ bottles} \rightarrow 6 \text{ bottles needed}$$

Your answer:

6

bottles

Please turn over

- 4 (d) The theatre director wants a spotlight that will give a circle of light on the stage with a diameter of approximately 2.15 m

The formula for working out the diameter of the light on the stage is:

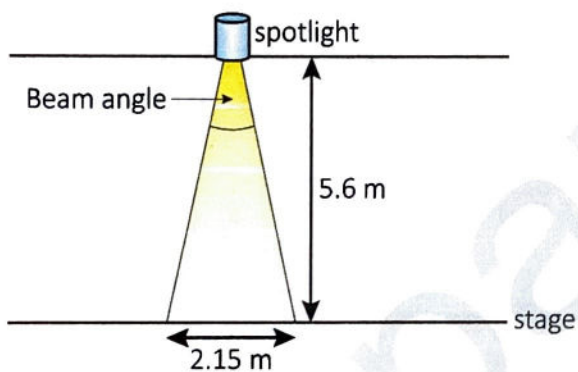
$$D = \frac{B \times H \times 18}{1000}$$

Where:

D is the diameter of the circle of light (in m)

B is the beam angle (in degrees)

H is the vertical distance from the spotlight to the stage (in m)



This table shows the available spotlights:

Spotlight	Beam angle
P	19°
Q	26°

Which spotlight should be chosen to get the diameter closest to 2.15 m?
Explain how you decide.

[3 marks]

$$P: \frac{19 \times 5.6 \times 18}{1000} = 1.9152 \text{ m.}$$

$$Q: \frac{26 \times 5.6 \times 18}{1000} = 2.6208 \text{ m.}$$

$$P: 2.15 - 1.9152 = 0.2348 \text{ m away}$$

$$Q: 2.6208 - 2.15 = 0.4708 \text{ m away.}$$

Choose P.

Your answer:

P.

4 (e)

The theatre needs new stage curtains.

Jan has been asked to order the fabric for the new curtains.

The total width of fabric needs to be $3\frac{1}{5}$ times the width of the stage front.

Write $3\frac{1}{5}$ as a decimal number.

[1 mark]

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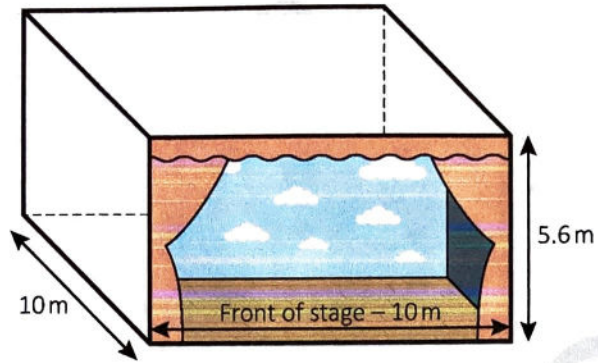
Your answer:

3.2

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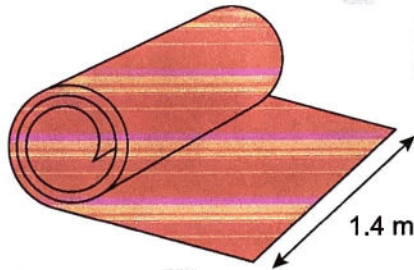
Pass Paper

- 4 (f) This is a diagram of the stage:



The total width of fabric needs to be $3\frac{1}{5}$ the width of the stage front.

Curtain fabric is sold in widths of 1.4 m



Several widths of fabric are sewn together to make the curtains.

The length of the curtains needs to be 5.8 m to allow for hems.

What length of fabric does she need?

[3 marks]

$$10 \times 3.2 = 32 \text{ m (width needed)}$$

$$\frac{32 \text{ m}}{1.4 \text{ m}} = 22.86 \rightarrow 23 \text{ needed.}$$

$$23 \times 5.8 \text{ m} = 133.4 \text{ m}$$

Your answer:

133.4

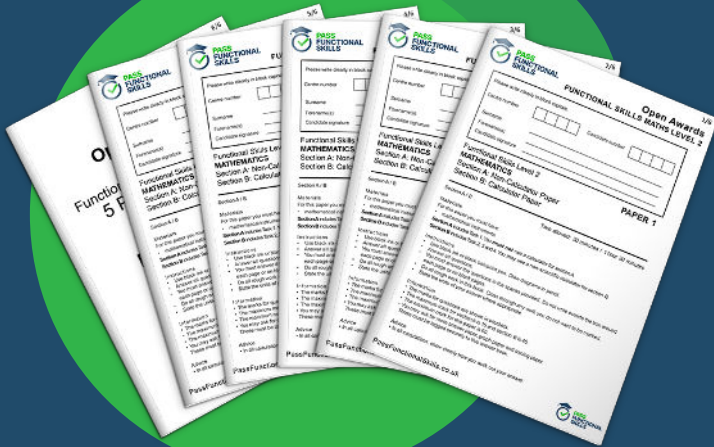
m

[Total marks: 15]

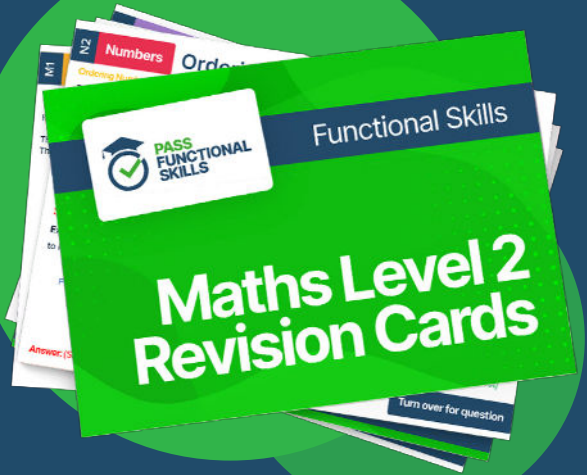
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