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

Paper number:	P001258
Section B:	Calculator Test

Assessment window: Monday 14 October 2019 – Friday 18 October 2019
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 π = 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.**

Activity 2:   Ice

2 (a)   Tom is studying science at college.
He is learning about ice.

Tom does an experiment.
He shows that the ratio of an ice cube's surface area to its volume affects the time it takes for the ice cube to melt.

This scatter diagram shows his results:

Time for ice cube to melt

Time
(minutes)

Surface Area : volume
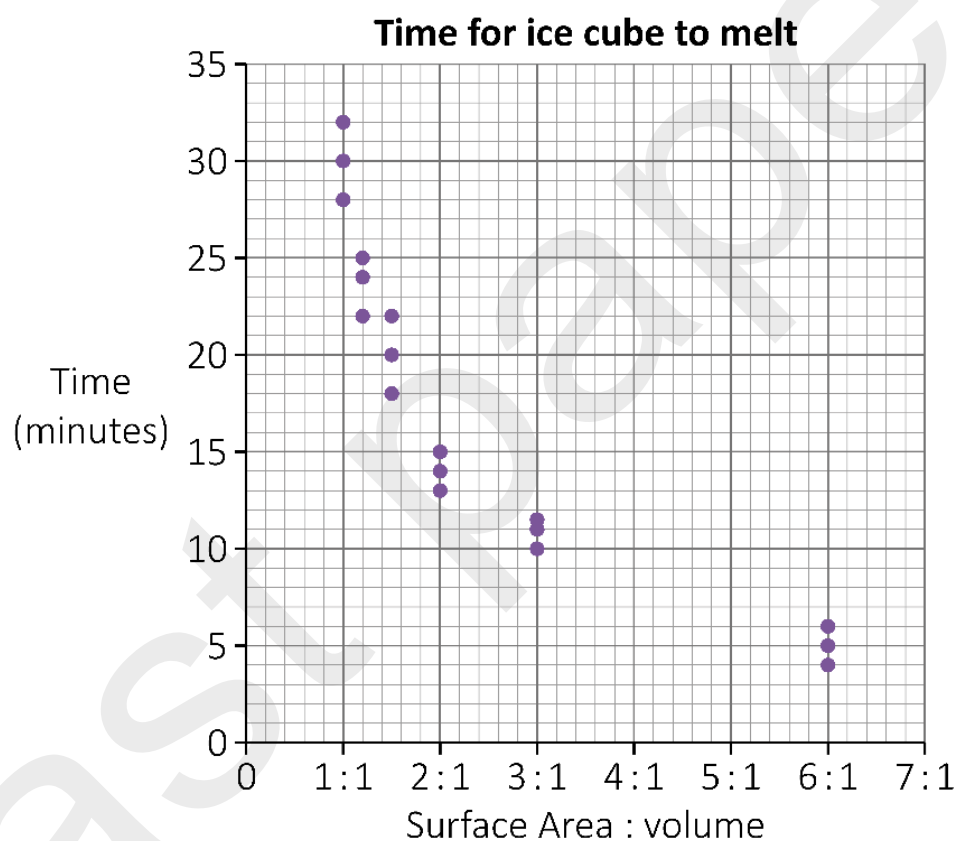
Tom has another ice cube.
Each side is 2.5 cm long.
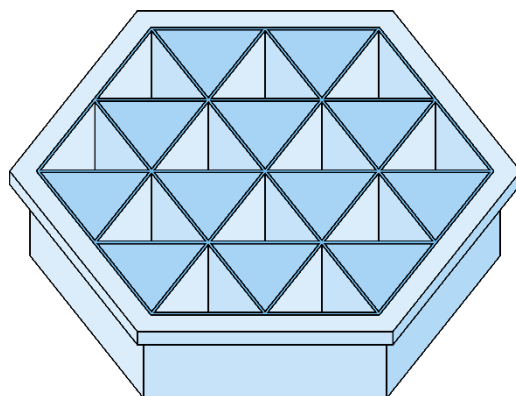
Estimate how long this ice cube will take to melt.

[4 marks]

Your answer: **minutes**

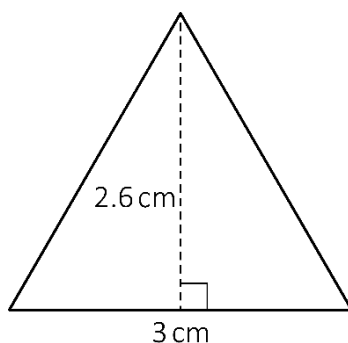**2 (b)**   In the science lab, Tom finds this mould for making 24 triangular prisms of ice.

Mould

Draw a triangular prism.

[1 mark]

2 (c) The triangular faces of each prism have base 3 cm and height 2.6 cm

2.6 cm

3 cm

Not drawn accurately

Tom fills the hexagonal mould with water to a depth of 3.5 cm

Tom knows that:

- to calculate the volume of each triangular prism, he can use the formula

  Volume = area of triangular face × depth of prism

- when a volume of water freezes, the ice that is formed has a volume 4% more than the volume of the water.

What will be the **total** volume of ice formed when all the water in the hexagonal mould freezes?

[5 marks]

Your answer: **cm³**

Please turn over

5

2 (d) Icebergs are large lumps of ice that float in the sea.

Tom reads that the icebergs float because the density of ice is less than the density of seawater.

The density of ice is 0.92 g per ml and the density of the sea is 1.03 g per ml

Calculate 0.92 as a percentage of 1.03

Give your answer as a percentage to the nearest whole number.

[2 marks]

Your answer: **%**

2 (e) Tom reads that scientists are planning to move an iceberg across the sea to provide water to a very dry country.

The iceberg weighs 40 million tonnes.

Write 40 million using numbers.

[1 mark]

Your answer:

2 (f)   The iceberg will melt as it travels.

By the time it arrives, the iceberg will weigh only 25 million tonnes.

By what fraction will the original iceberg have reduced in weight by the time it arrives?

Give your answer in its simplest form.

[2 marks]

Your answer:

[Total marks: 15]

Please turn over

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Activity 3:   Wages

3 (a)   Faisal starts a new job.

He will work 37 hours a week for 48 weeks a year and is paid £8.25 an hour.

He must pay:
- 0% income tax on the first £12 500 he earns each year
- 20% income tax on anything over £12 500 that he earns.

His income tax payments are spread evenly over the 48 weeks.

Faisal's first weekly wage slip shows that he has paid £8.96 income tax.

He thinks he has paid more than he should.

Is he correct?

Show how you decide.

[4 marks]

Your answer:

8

3 (b)   Sonya reads an article about the 5 : 3 : 2 rule.

The rule says you should spend your wages after tax in the ratio 5 : 3 : 2 on **needs : wants : savings**

- **needs** are bills like rent that must be paid
- **wants** are extra things like social life and new clothes which are not needed
- **savings** are amounts of money kept for the future.

Sonya earns £480 a week after tax.

Last week she spent £185 on going out with friends.

Was this in line with the 5 : 3 : 2 rule?

Show how you decide.

[2 marks]

Your answer:

Please turn over

3 (c)   Dec needs to pay £908.64 each month for his mortgage and other bills.

This is 45% of his monthly income.

What is Dec's monthly income?

Give your answer to the **nearest ten pounds**.

[2 marks]

Your answer: £

3 (d)   The manager of a small business claims that the mean salary in the company has gone up by over 10% in the last year.

One of the workers says that the gap between the highest and lowest earners has more than doubled.

Use this data about the company salaries to decide whether **each** of the statements is true. Show your working.

[5 marks]

Annual salaries (£s)						
Last year (12 employees)				**This year (14 employees)**		
15 275	42 122	15 679		15 500	33 775	17 995	34 065
20 000	25 344	25 879		21 339	20 112	24 995	23 115
85 682	15 998	53 245		157 250	40 631	45 888	
55 333	70 507	32 196		60 200	80 555	17 160	

Your answer:

Please turn over

3 (e) Dave is a salesman.

He is paid a basic salary plus a bonus based on the sales he makes.

Last year Dave's bonus was $\frac{3}{8}$ of his salary.

Write $\frac{3}{8}$ as a decimal **and** as a percentage.

[2 marks]

Decimal:

Percentage:

[Total marks: 15]

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Please turn over for the next activity.

Activity 4:   Archaeology

**4 (a)**   Archaeologists study human history by digging up and analysing items from the past.

Chen is a volunteer with a community archaeology group.
At the weekends she helps to dig at an archaeological site.

The volunteers have to record exactly where each item is found.
They do this by using a coordinate grid laid over a map of the site.

The volunteers have found the wall of a building.
It runs in a straight line from (−125, 100) to (150, −75)

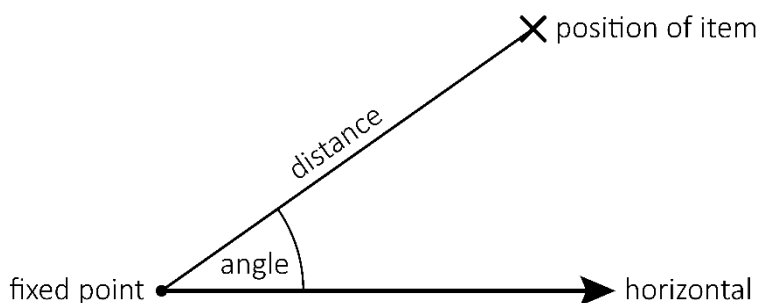Draw the position of the wall on the grid.

[2 marks]
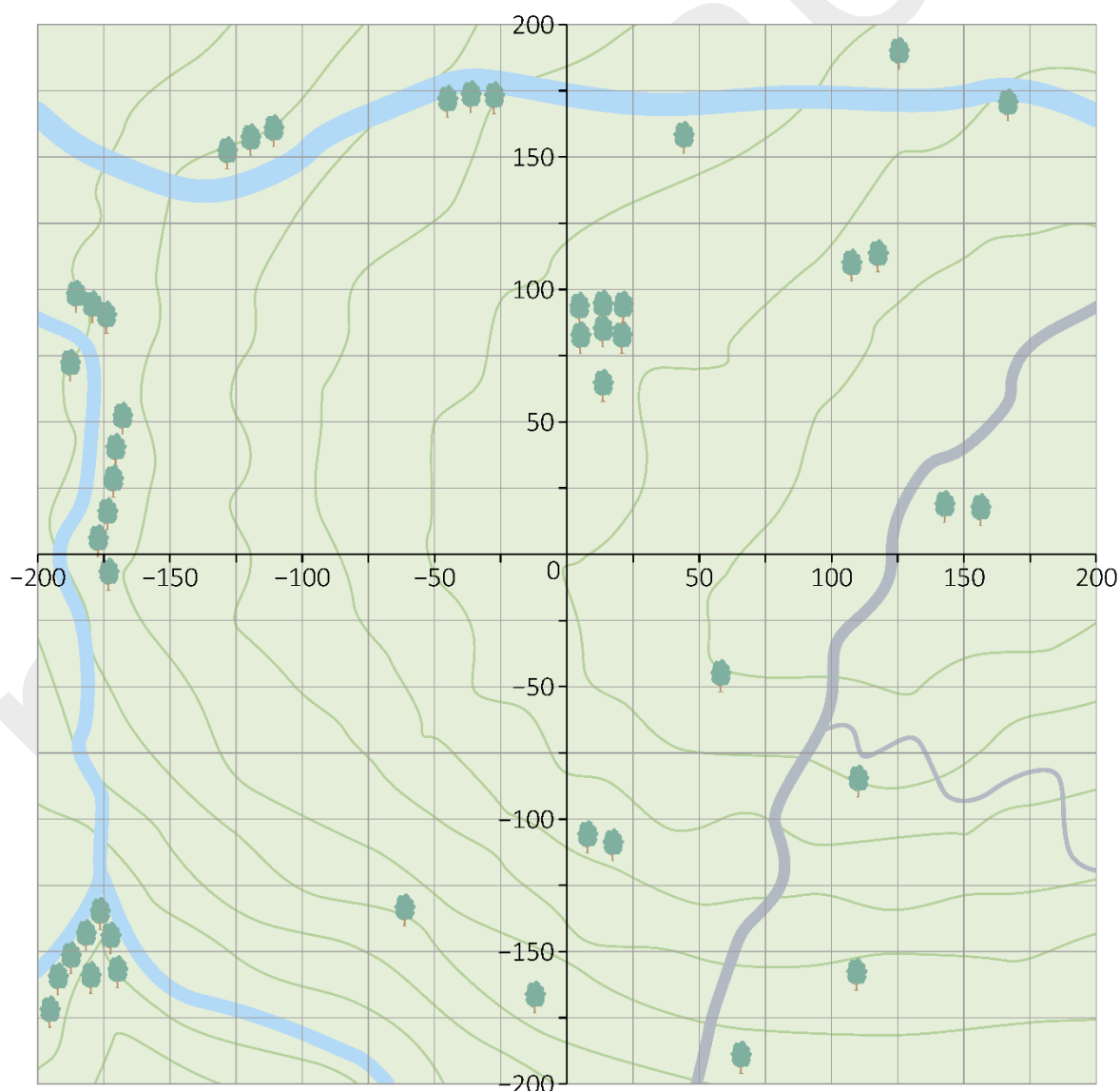
4 (b)   There is another way that the volunteers can record the position of an object:

- measure the object's distance from a fixed point and
- measure the angle (see example in the diagram below).

The volunteers find an object at the point (100, 100) on the coordinate grid.

i)   Mark the point on the grid in **4 (a)**.

The volunteers measure the distance of the object from the fixed point (0, 0)
They then measure the angle.
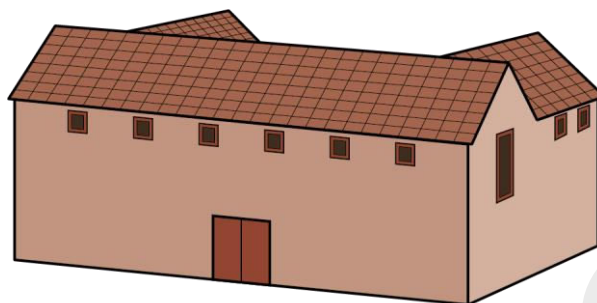
ii)   What size is the angle?

[2 marks]

Your answer: **degrees**
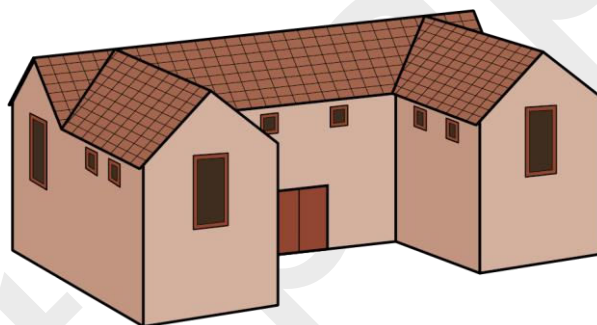
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15

4 (c)   The volunteers find parts of a building.

They think the building used to look like this:

Front view

Back view

Draw:
- the plan view **and**
- the side elevation of the building.

[2 marks]

Plan view:

Side elevation:

4 (d) Chen reads about some footprints that were preserved in volcanic ash.

The foot length was 18.8 cm and the stride length (the distance between the footprints) was 164.5 cm

Archaeologists use the formula: $R = \dfrac{\text{stride length}}{4 \times \text{foot length}}$

Chen uses a calculator to calculate R for the footprints found in the volcanic ash.

She enters 164.5 ÷ 4 × 18.8 and gets the answer 773.15

Explain what Chen has done wrong.

[1 mark]

4 (e) If R is less than 2.0 the person was probably walking.
If R is greater than 2.9 the person was probably running.
If R is in between 2.0 and 2.9 it is not possible to decide.

Tick the correct statement about the person whose footprints were preserved in the volcanic ash.

☐ They were probably walking.

☐ They were probably running.

☐ It is not possible to decide.

Explain your choice.

[2 marks]

4 (f)   There are 10 volunteers in the community archaeology group.

The probability that they all attend on a Saturday is 0.35
The probability that they all attend on a Sunday is 0.12

The site is open next weekend.

Calculate the probability that all the volunteers will attend on both Saturday and Sunday next weekend.

Give your answer as a percentage.

[2 marks]

Your answer: **%**

4 (g) The site was open on Saturday and Sunday for 26 weekends during last year.

This table shows the number of days each volunteer attends out of the 52 days available.

The information for Chen is missing.

Volunteer	Number of days
Ada	48
Barry	25
Tim	30
Chris	24
Gwen	43
Sia	39
Rita	40
Rav	18
Jon	35
Chen	

Chen says that the mode of the 9 values is 48

Is she correct?

Explain your answer.

[1 mark]

4 (h)   The median number of days for the 10 volunteers including Chen was 33.5

What fraction of the days did Chen attend?

Give the fraction in its simplest form.

[3 marks]

Your answer:

[Total marks: 15]

This is the end of the external assessment.