N5

National Qualifications 2018

Mark

X844/75/01

Applications of Mathematics
Paper 1 (Non-Calculator)

THURSDAY, 3 MAY

9:00 AM – 10:05 AM

X8447501

Fill in these boxes and read what is printed below.

Full name of centre

Town

Forename(s)

Surname

Number of seat

Date of birth

Day	Month	Year	Scottish candidate number

Total marks — 45

Attempt ALL questions.

You may NOT use a calculator.

To earn full marks you must show your working in your answers.

State the units for your answer where appropriate.

Write your answers clearly in the spaces provided in this booklet. Additional space for answers is provided at the end of this booklet. If you use this space you must clearly identify the question number you are attempting.

Use **blue** or **black** ink.

Before leaving the examination room you must give this booklet to the Invigilator; if you do not, you may lose all the marks for this paper.
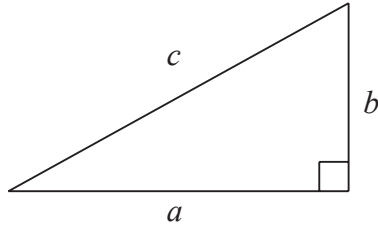
✕SQA

A/HTP

FORMULAE LIST

Circumference of a circle: $C = \pi d$

Area of a circle: $A = \pi r^2$

Theorem of Pythagoras:

$$a^2 + b^2 = c^2$$

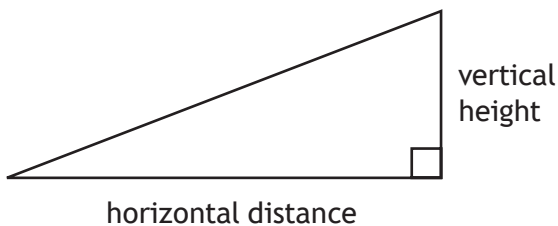Volume of a cylinder: $V = \pi r^2 h$

Volume of a prism: $V = Ah$

Volume of a cone: $V = \frac{1}{3} \pi r^2 h$

Volume of a sphere: $V = \frac{4}{3} \pi r^3$

Standard deviation: $s = \sqrt{\dfrac{\Sigma(x - \bar{x})^2}{n - 1}} = \sqrt{\dfrac{\Sigma x^2 - (\Sigma x)^2 / n}{n - 1}}$, where n is the sample size.

Gradient:

vertical height

horizontal distance

$\text{gradient} = \dfrac{\text{vertical height}}{\text{horizontal distance}}$

Total marks — 45

Attempt ALL questions

1. A baking company will reject cakes if they do not weigh $400\,\text{g} \pm 3\%$.

   The weights of a sample of 13 cakes are shown below.

   385, 391, 409, 403, 386, 412, 413, 407, 400, 390, 387, 405, 388

   Calculate the fraction of cakes that will be rejected.

   Use your working to justify your answer. **3**

2. Jennifer is planning to go on a **4 night** city break.

    The costs are shown in the table below.

Flights	£270
Accommodation	£90 per night
Spending money	£450
Insurance	£30

    She earns £400 per week.

    She saves $\frac{1}{8}$ of her earnings each week towards her city break.

    Calculate the minimum number of weeks it will take Jennifer to save enough money for her city break.   3
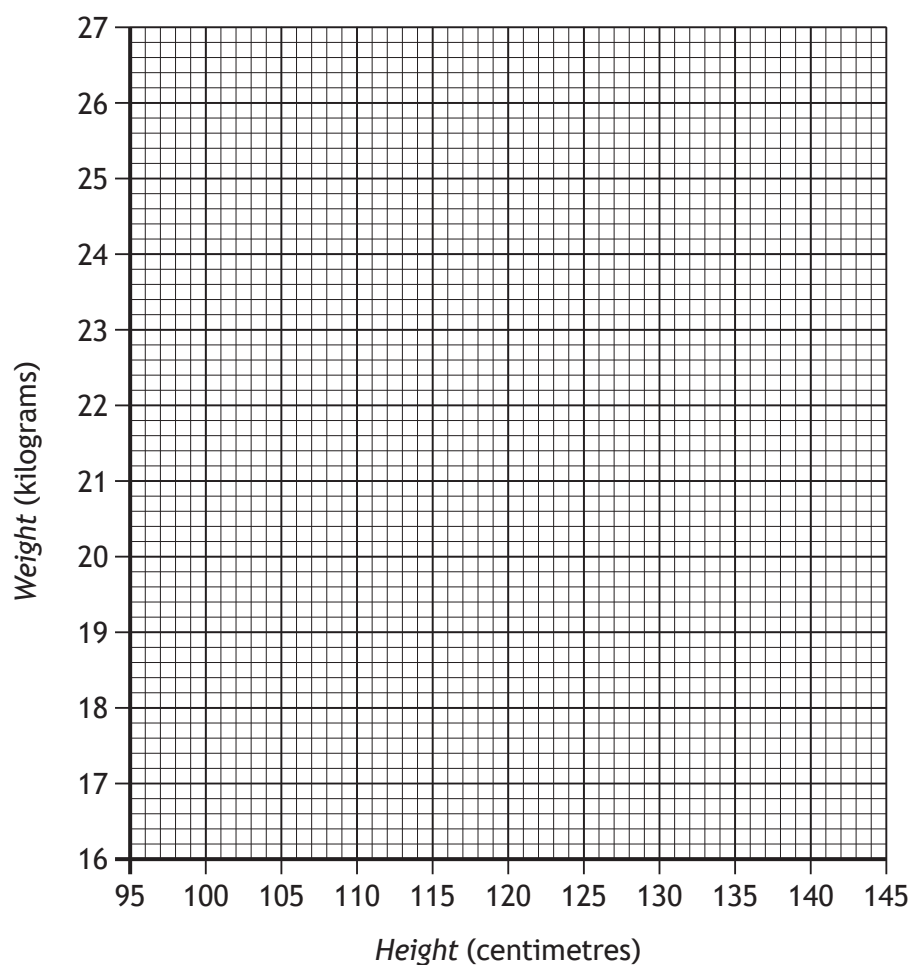
3. The heights and weights of 8 children aged six are recorded in the table below.

Height in centimetres	104	107	120	124	99	127	104	130
Weight in kilograms	18	19	24	22	17	25	19	24

(a) On the grid below draw a scattergraph to show this data. **2**

(An additional grid, if required, can be found on *page 17*.)

Weight (kilograms)

Height (centimetres)

(b) Draw a line of best fit on the scattergraph. **1**

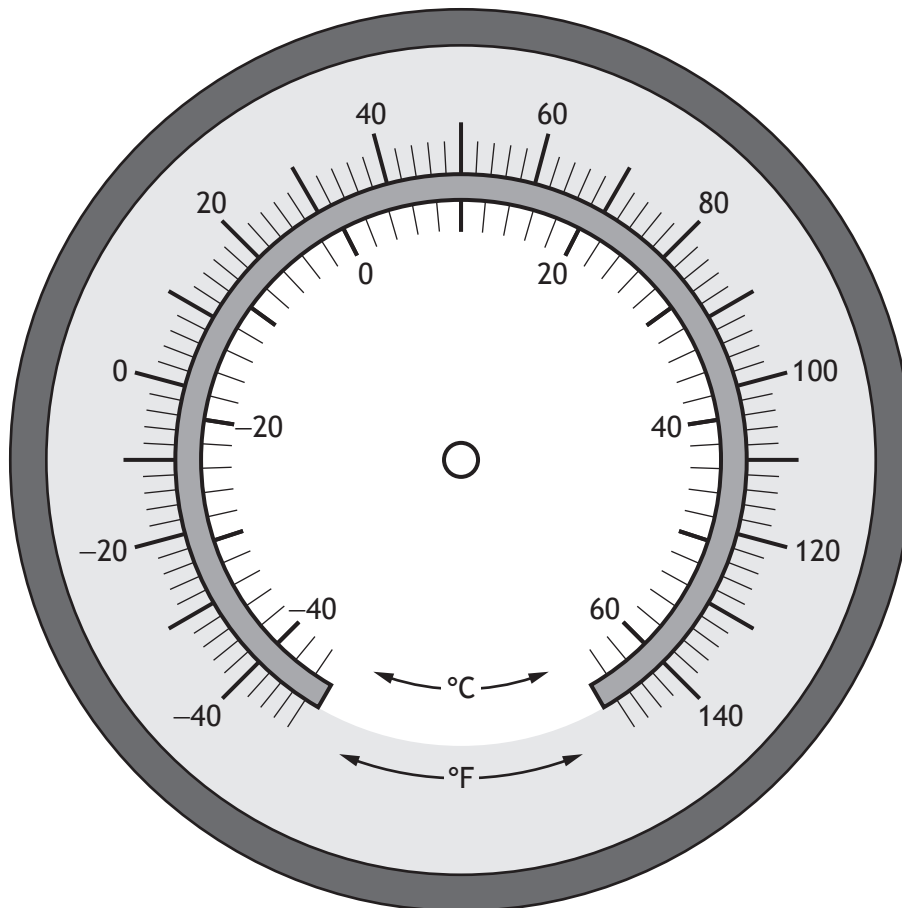(c) Use your line of best fit to estimate the height of a child who weighs 20 kilograms. **1**

4. Lynn is flying an aircraft and has been told that the outside temperature is 34 °C lower than the ground temperature.

The ground temperature is 6 °C.

Calculate the outside temperature and mark it on the gauge below.   **2**

(An additional gauge, if required, can be found on *page 18*.)

5. Guests at a wedding were asked to choose their main course.

- $\dfrac{3}{7}$ of the guests chose chicken

- $\dfrac{1}{3}$ of the guests chose beef

- the remaining guests chose the vegetarian option.

Calculate the fraction of guests that chose the vegetarian option.

3

6. Tom thinks that the answer to the following calculation is 8·7.

$$27{\cdot}2 - 4{\cdot}6 \times 3 + 4{\cdot}7$$

Is Tom correct?

Use your working to justify your answer.

2

7. Gavin is going to South America to do charity work.

   He changes £750 into Bolivian boliviano.

Currency exchange	
Pounds sterling (£)	**Other currencies**
1	20 Argentine peso
1	9 Bolivian boliviano
1	4 Brazilian real

   (a) How many Bolivian boliviano will he receive?   **1**

   He spends 2700 Bolivian boliviano.

   He changes the remaining Bolivian boliviano into Argentine peso.

   (b) How many Argentine peso will he receive?   **2**

8. Ian buys a new sofa.

The original price was £700.

The shop is having a sale with 25% off the price of all sofas.

When he goes to the shop he finds there is an additional 5% off the sale price.

Calculate the price Ian pays for his sofa. **3**

9. Steven flew to Hong Kong to start a new job.

The flight included a stop in Doha.

He flew from Edinburgh to Doha then from Doha to Hong Kong.

- The flight from Edinburgh to Doha took 6 hours 35 minutes.

- The flight from Doha to Hong Kong took 7 hours 20 minutes.

- Hong Kong is 8 hours ahead of Edinburgh.

Steven's plane took off from Edinburgh at 9:15 am local time.

It landed in Hong Kong at 8:50 am local time.

How long was the stop in Doha?   **3**

10. David sat a class test.

His results are shown in the table below.

	Marks available	Percentage achieved
Paper 1	35	80%
Paper 2	65	60%

(a) Calculate the number of **marks** he achieved in paper 1.   **1**
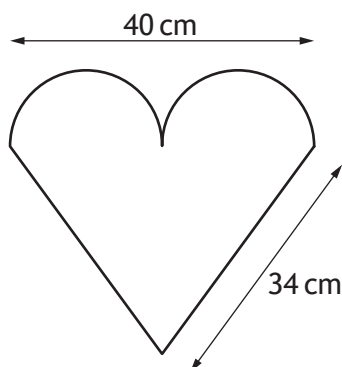
(b) Calculate his overall percentage for this test   **1**

11. Ribbon has to be placed around the outside of the love heart cake shown below.

40 cm

34 cm

The top of the cake is in the shape of an isosceles triangle with two identical semi-circles.

The ribbon needs to be the length of the perimeter of the top of the cake plus an extra 2·8 cm.

Calculate the length of ribbon needed for the cake.   **3**

Take $\pi = 3\cdot14$.

12. A helicopter flew from Aberdeen airport to transport workers to oil rig 1 and then continued on to oil rig 2.

It flew 82 km on a bearing of 042° to oil rig 1.

It then flew 46 km on a bearing of 194° to oil rig 2.

(a) Construct a scale drawing to illustrate this journey. **3**

Use a scale of 1 cm : 10 km.

(An additional diagram, if required, can be found on *page 19*.)

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↑

Airport

The helicopter then returns to Aberdeen airport from oil rig 2.

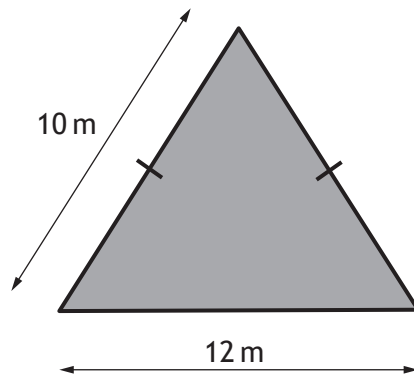(b) Use the scale drawing to determine the distance and bearing of the airport from oil rig 2. **2**

13. A lawn is to be created in the shape of an isosceles triangle with dimensions as shown below.
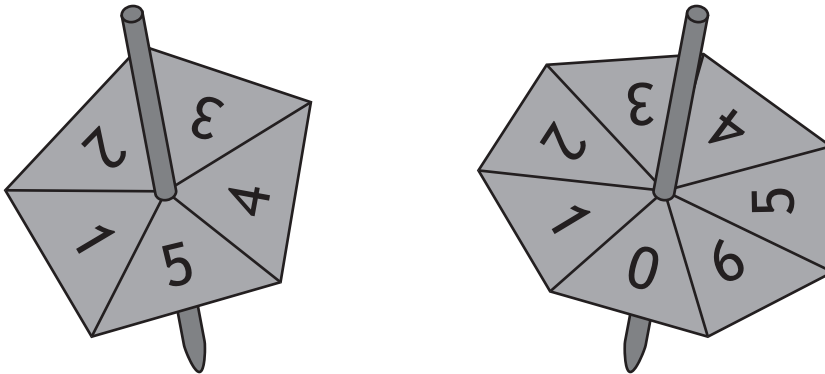

Calculate the area of the lawn. **3**

14. Michael runs a stall at the school fayre.

His game requires two spinners to be spun and allowed to come to rest.
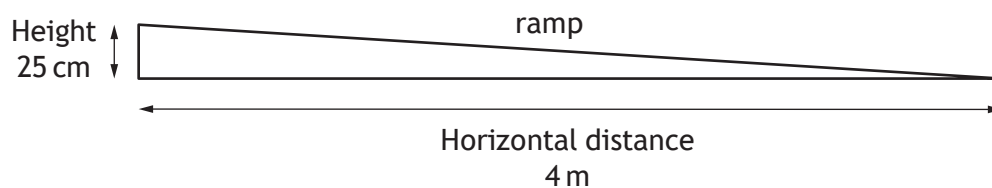
The spinners are shown below.

The numbers on which the spinners come to rest are multiplied together.

To win a prize the answer to this multiplication must be **less than 5**.

Calculate the probability of winning a prize.   **3**

15. A ramp to allow wheelchair access to a school has the dimensions shown below.

Height
25 cm

ramp

Horizontal distance
4 m

The maximum gradient allowed for a ramp with a horizontal distance of 4 m is $\frac{1}{14}$.

Does the gradient of this ramp meet the regulations?

Use your working to justify your answer.

3

[END OF QUESTION PAPER]