Mark

N5

National Qualifications 2016

X744/75/02

Lifeskills Mathematics
Paper 2

WEDNESDAY, 4 MAY

10:10 AM – 11:50 AM

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 — 55

Attempt ALL questions.

You may use a calculator.

Full credit will be given only to solutions which contain appropriate working.

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 book to the Invigilator; if you do not, you may lose all the marks for this paper.

SQA

A/HTP

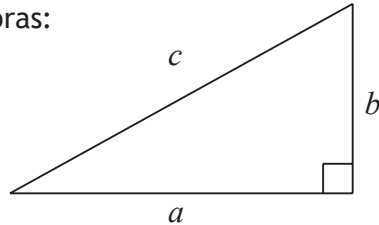**FORMULAE LIST**

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

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

Theorem of Pythagoras:

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

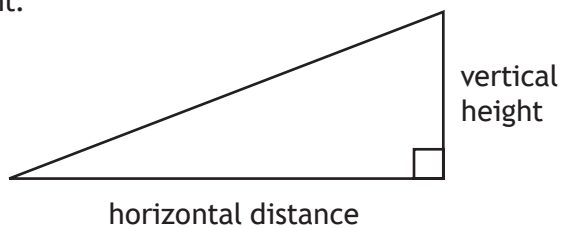Volume of a cylinder: $V = \pi r^2 h$

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:

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

Total marks — 55

Attempt ALL questions

1. The population of Scotland is recorded to the nearest hundred.

   In 2014, the population was 5 347 600.

   In 2015, the population was 5 369 000.

   (a) Show that the percentage growth in population from 2014 to 2015 was 0·4%.

   2

   (b) If the population continues to grow at the same rate, calculate the expected population in 2018.

   Give your answer to the **nearest hundred**.

   3

   [Turn over

2. Chris flew from Perth, Australia, to London, United Kingdom, on Saturday 9th January 2016.

- The plane left Perth, Australia, at 13:05.

- The total journey time, including a stopover in Dubai, is 20 hours and 25 minutes.

- Perth time is 8 hours ahead of London.

At what time did the plane land in London?　　　　　**2**
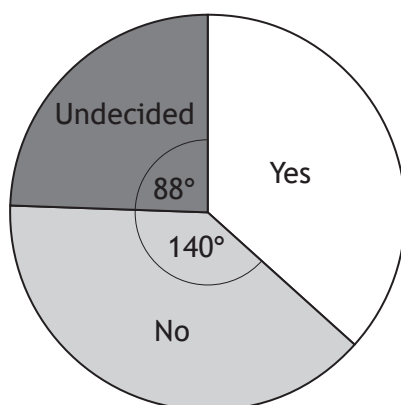
3. In September 2014 there was a referendum to determine the future of Scotland.

An opinion poll was taken in December 2013.
The question asked was "Should Scotland be an independent country?"

The results are shown in the pie chart below.

Another opinion poll was taken in April 2014.
1208 people were asked the same question as in December 2013.

The results of this poll are shown in the table below.

YES	NO	UNDECIDED
447	616	145

Compare the two opinion polls and make one relevant comment on the differences between them.

3

4. Alison and Michael are travelling to Inverie on Knoydart for a holiday. They must take a ferry from Mallaig to Inverie

(a) The direct distance from Mallaig to Inverie is 9·8 kilometres.

(i) Calculate the scale used in the diagram above. **1**

(ii)

The ferry leaves Mallaig and travels North for 0·6 km .

The ferry then changes direction to sail directly to Inverie.

Use the second diagram to find the bearing and distance, in kilometres, that the ferry must travel on the **second part** of its journey. **2**

4. (continued)

(b) The average speed of the ferry from Mallaig to Inverie is 24 ± 3 kilometres per hour depending on tide and weather.

What is the shortest time that the **complete** ferry journey might take?

Give your answer to the **nearest minute**.　　3

[Turn over

5. Fiona is planning to stay in New York, USA, for three days.
She researches the cost of various attractions.

Attraction	Full price in US Dollars
Empire State Building	$32
Top of the Rock Observation Deck	$30
Statue of Liberty Cruise	$40
9/11 Memorial and Museum	$24
Waxworks	$37
One World Observatory	$32

Fiona will visit all six of these attractions while she is there.

Fiona plans to buy a discount card to reduce the cost of visiting these attractions.

Not all of the attractions are included in all of the cards. Fiona must pay full price for these.

Card 1: NY Card

<div style="border:1px solid">

NY Card

Attractions:

★ Sea and Space Museum ★   ★ Top of the Rock Observation Deck ★

★ Museum of Natural History ★   ★ 9/11 Memorial and Museum ★

★ Statue of Liberty Cruise ★   ★ Empire State Building ★

★★★★ Total Cost $114 ★★★★

</div>

Benefits:

These six attractions can be visited for a single payment of $114.
This card can only be used once per attraction.
It is valid for 30 days from first use.

Card 2: Explore NY Card

<div style="border:1px solid">

Explore NY Card
Attractions:

9/11 Memorial and Museum · Statue of Liberty Cruise

Museum of Natural History · Sea and Space Museum

Empire State Building · Top of the Rock Observation Deck

Waxworks · Carnegie Hall · Rockefeller Centre Tour

Cost for any 3 attractions $71

</div>

Benefits:

This card can be used for any 3 attractions from the list.
This card can only be used once per attraction.
It is valid for 30 days from first use.

5. **(continued)**

Card 3: NY Town Pass

<div>

NY Town Pass

80+ attractions are included for one price.
When activated the card is valid for 1, 2, 3 or 5 days.
These must be consecutive days.

Cost

$90 1 day pass $180 3 day pass
$140 2 day pass $190 5 day pass

</div>

Benefits:

　All of Fiona's chosen attractions can be visited with this card.

(a) During her three-day visit, Fiona will visit two attractions each day.

　Fiona is going to buy one discount card.

　(i) Calculate the total cost of all six attractions if Fiona buys Card 1.　**2**

　(ii) Calculate the cheapest price that Fiona could pay for entry to her six chosen attractions.　**4**

(b) Fiona pays the cheapest price for entry to her six chosen attractions.

　She pays before leaving the UK.

　The cost is £100·96.

　Calculate the exchange rate that Fiona received.

　Give your answer correct to **3 decimal places**.　**2**

6. Fraser tests motorcycle tyres on racing circuits.

On Monday he tested Goodhold tyres.

His lap times, in seconds, are given below.

81·8   81·7   81·6   81·0   80·3   80·2

(a) For Fraser's times on Goodhold tyres, calculate:

   (i) the mean;   **1**

   (ii) the standard deviation.   **3**

6. (continued)

(b) Fraser then changed to Megagrip tyres and recorded his times for another six laps.

These times produced a mean of 81·6 seconds and standard deviation of 0·65 seconds.

Make two valid comments comparing the two types of tyres.   **2**

(c) Another rider completed one lap of the circuit in 81·0 seconds.

The track is 3·6 kilometres long.

Calculate his average speed in **kilometres per hour**.   **3**

7. Grace works for a company selling fitted kitchens.

She is paid a basic monthly salary of £500.

She also receives 5% commission on all her sales **above** £8000.

In January Grace sells £23 000 of goods.

Her monthly deductions are 12% of her gross income.

Grace writes down her budget for the month.

Rent	£245
Bills	£198
Food	£164
Entertaining	£75

Grace saves any surplus.

(a) Calculate Grace's **net** pay for January. **4**

(b) (i) Calculate the surplus that Grace will have for January. **1**

(ii) Grace's rent increases to £260 per month.

Calculate the percentage increase in her rent. **2**

7. (continued)

(c) To buy a car Grace needs to borrow £4500.

She wants to repay the loan **as soon as possible**.

She investigates the cost of the loan from five different lenders.

The table shows the repayments for a £4500 loan.

Lender	12 months	24 months	36 months
Tasko	£413·86	£215·07	£150·60
Bank of Shapes	£418·54	£219·31	£157·42
TMS	£458·83	£260·59	£197·74
Premier Bank	£422·46	£214·74	£159·21
Free Bank	£432·99	£234·15	£170·09

Grace assumes that she will earn the same commission each month.

Calculate her **new monthly surplus** and determine from which lender she should take her loan, and over how many months. **2**
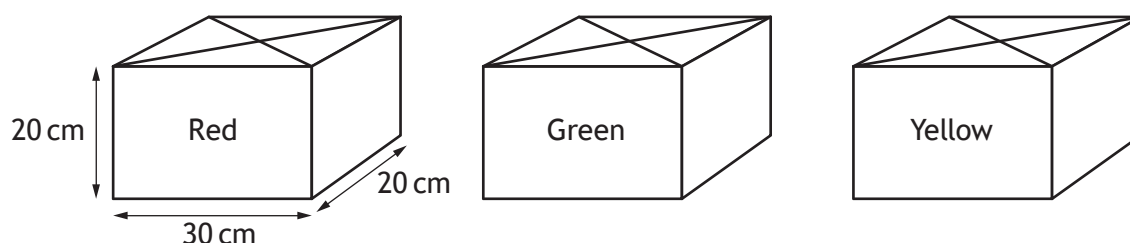
8. Brendan makes candles from blocks of wax.

Each block of wax is a cuboid measuring 30 cm by 20 cm by 20 cm as shown.

20 cm — Red — 20 cm — 30 cm — Green — Yellow

Each candle contains the colours red, green and yellow in the ratio 3 : 1 : 2 respectively.

Each candle is a cube with volume 729 cm³.

(a) Brendan only has 1 block of each colour.
What is the maximum number of candles that he can make? **3**

Brendan makes the maximum number of candles.
Any wax that is left over is thrown away.

Each block of wax costs £13·75.
Brendan also buys wicks which cost 18p per candle.

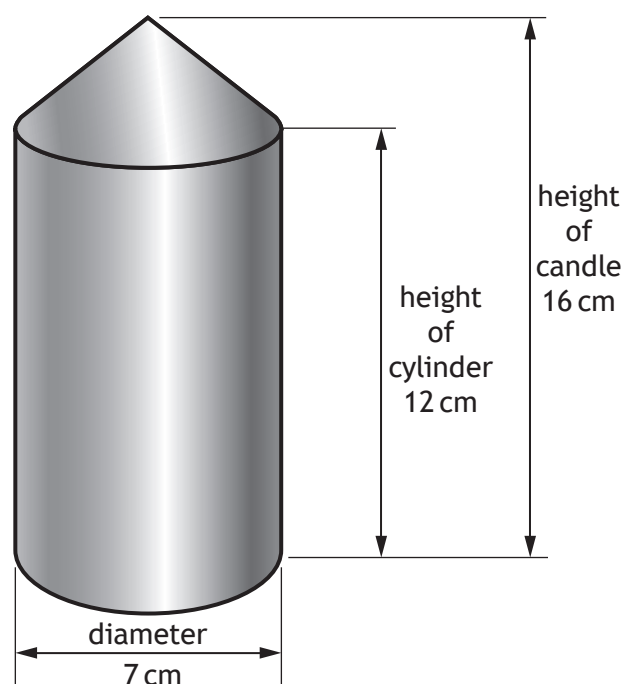Brendan adds 65% to his costs when calculating the selling price of each candle.

(b) What is Brendan's selling price for each candle? **3**

8. (continued)

Brendan also makes blue candles in the shape of a cylinder with a cone on top as shown.

height of candle 16 cm

height of cylinder 12 cm

diameter 7 cm

(c) He buys blue wax in blocks with volume 12 000 cm^3.

Brendan thinks that he can make 25 of these candles from one block of wax.

Is he correct?

Use your working to justify your answer. **7**

[END OF QUESTION PAPER]

ADDITIONAL SPACE FOR ANSWERS

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