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National
Qualifications
2017

Mark

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X744/75/02**Lifeskills Mathematics
Paper 2**

MONDAY, 29 MAY

2:10 PM – 3:50 PM



* X 7 4 4 7 5 0 2 *

Fill in these boxes and read what is printed below.

Full name of centre

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Town

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Forename(s)

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Surname

--

Number of seat

--

Date of birth

Day

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Month

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Year

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Scottish candidate number

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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.



* X 7 4 4 7 5 0 2 0 1 *

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: $V = \pi r^2 h$

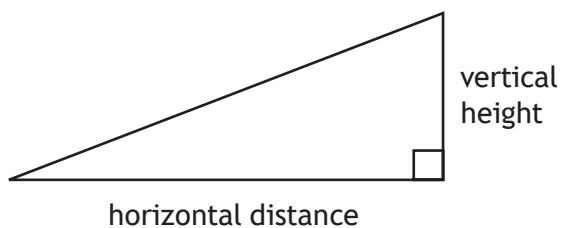
Volume of a prism: $V = Ah$

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

Gradient:

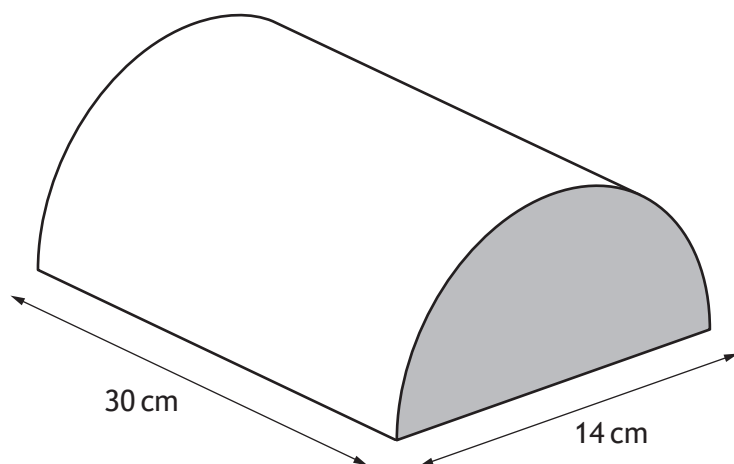


$$\text{gradient} = \frac{\text{vertical height}}{\text{horizontal distance}}$$



* X 7 4 4 7 5 0 2 0 2 *

1. The Victorians used stoneware hot water bottles.
They were semi-circular prisms as shown.
The diameter of the bottle is 14 cm and the length is 30 cm.



Calculate the volume of the hot water bottle.

3



* X 7 4 4 7 5 0 2 0 3 *

2. Asif bought 8000 shares in a local company in April 2013.

Each share cost him 73 pence.

The value of the shares

- decreased by 3% in the first year then,
- increased by 4·2% in each of the next **two years**.

- (a) How much were Asif's shares worth in total in April 2016?

5

In April 2017 Asif's shares were worth £6560 in total.

He decided to sell 5000 of his shares.

He was charged £12·95 commission on his sale.

- (b) How much did he receive from the sale of the shares?

2



* X 7 4 4 7 5 0 2 0 4 *

3. Kyle is buying a new three piece suite.
It is advertised at a price of £1260.

3 PIECE SUITE FOR SALE



£1260

Kyle can't afford to pay this all at once.

He decides to use a payment plan to buy the three piece suite.

The **total price** of the payment plan is **12% more** than the advertised price.

The payments are calculated as follows:

- deposit of $\frac{1}{3}$ of the total price
- 8 equal monthly instalments
- final payment of £200.

How much will each monthly instalment be?

4



4. The back to back stem and leaf diagram shows data gathered at a gymnasium before and after walking on a treadmill.

Heart rate data (beats per minute (bpm))

Before

After

9 8 3 2 0	5	9	
6 6 6 1 1 0 0	6	2 4 7 8 8	7 8 = 78
9 6 2	7	1 1 1 8	
	8	2 4 9	
	9	2 5	

n = 15

n = 15

- (a) State the most common heart rate (bpm) **after** walking on the treadmill. 1
- (b) What is the difference in the median heart rates (bpm) before and after walking on the treadmill? 2

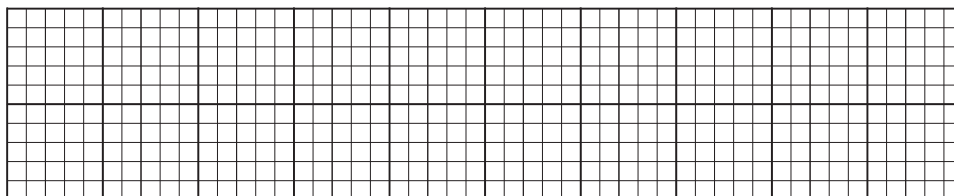


* X 7 4 4 7 5 0 2 0 6 *

4. (continued)

- (c) Construct a boxplot to show the heart rate data **after** exercise.
(An additional diagram, if required, can be found on *Page 16*.)

4



* X 7 4 4 7 5 0 2 0 7 *

5. Mr and Mrs Sibbald went on a cruise.
Part of the cruise involved sailing from Villefranche to Livorno.
The map below shows the route the ship takes.



The scale of the map is 1 : 3 000 000

- (a) Calculate the distance from Villefranche to Livorno.
Give your answer in kilometres.

2

It took 7 hours and 30 minutes to sail from Villefranche to Livorno.

- (b) Calculate the average speed of the ship's journey.
Give your answer in knots.
1 kilometre per hour = 0.54 knots
Round your answer to 2 significant figures.

3



* X 7 4 4 7 5 0 2 0 8 *

5. (continued)

Mr and Mrs Sibbald took £2400 spending money.

They exchanged 55% of their money into euro, to spend ashore.

The exchange rate was £1 = 1.15 euro.

By the end of the cruise they had spent 1379 euro.

(c) Calculate how many euro they had left at the end of the cruise.

2

Mr and Mrs Sibbald take part in an on board lottery which consists of a draw from a set of 32 balls numbered from 1 to 32.



(d) (i) What is the probability that the first ball drawn has a number greater than 25?

1

In the draw four numbered balls are drawn and not replaced.

A further bonus ball is also drawn.

(ii) What is the probability of the number 9 being drawn as the bonus ball if it was not drawn in the first four?

2



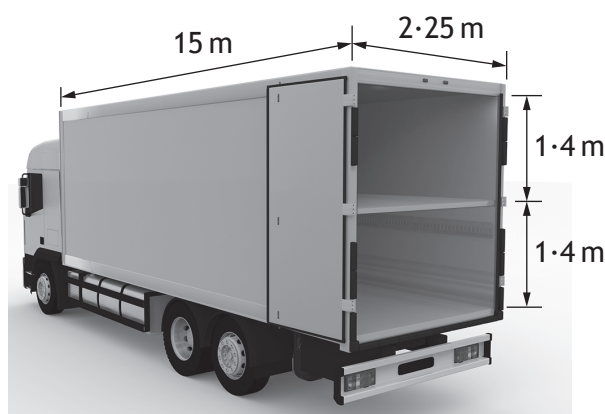
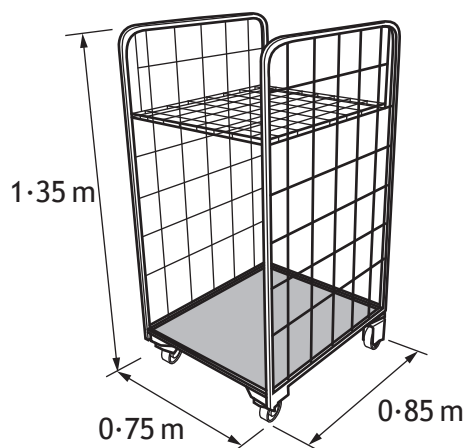
6. Russell is a lorry driver for a mail delivery company.

The mail is packed into cages which are then loaded on to the lorry.

His lorry has two levels for fitting cages.

Each cage has wheels on the bottom and must always be **loaded upright**.

The dimensions of the cage and the internal dimensions of the back of the lorry are shown in the diagrams.



- (a) What is the maximum number of cages that can be loaded into the back of the lorry?

3



6. (continued)

Russell works night shift.

- He works from 2300 until 0900 the next day.
- His rate of pay is £14.40 per hour.
- He gets paid time and a half between 2200 and 0730.
- He works 5 shifts each week.

(b) Calculate his weekly gross pay.

3



* X 7 4 4 7 5 0 2 1 1 *

7. Mr Mackenzie has decided to move to South Africa with his family. He has been offered jobs in both Durban and Cape Town.

The typical monthly temperatures from March to August in Durban are recorded in the table below.

Month	Temperature (°C)
March	24
April	22
May	19
June	18
July	17
August	17

- (a) For the typical monthly temperatures in Durban, calculate:

(i) the mean;

1

(ii) the standard deviation.

3



* X 7 4 4 7 5 0 2 1 2 *

7. (continued)

In Cape Town the mean monthly temperature for the same period is 15.5°C and the standard deviation is 1.87°C .

(b) Make two valid comments comparing the temperatures in both cities.

2

Mr Mackenzie accepts the job in Durban.

As part of his job he is in contact with the London, New York and Mumbai offices of the company he works for.

He is planning a conference call at 3:30 pm the following day, from his office in Durban.

At 17:25 he noticed the clocks on the wall of his office showed the times below.

10:25	15:25	17:25	22:55
New York	London	Durban	Mumbai

All offices work 08:00 to 18:00 local time.

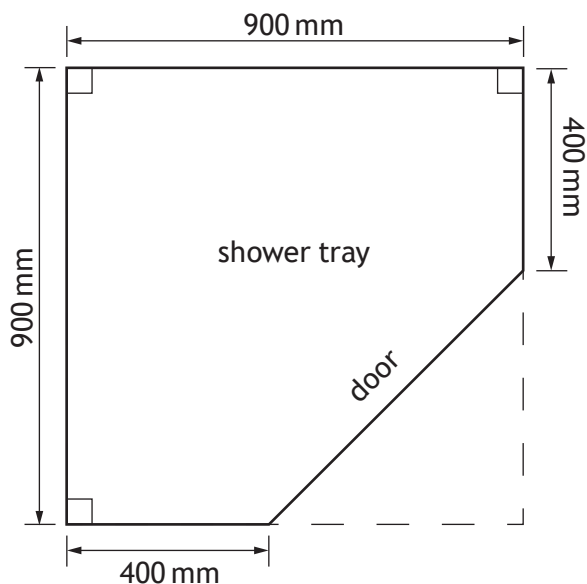
(c) Which offices are available to take part in the conference call?

3



* X 7 4 4 7 5 0 2 1 3 *

8. Zuzanna is remodelling her shower room.
She considers two designs.
The first design has a pentagonal shower tray.
The door will be fitted on the side of the tray as shown.



- (a) Calculate the length of the side where the door will go.

3

- (b) Calculate the area of the pentagonal shower tray.

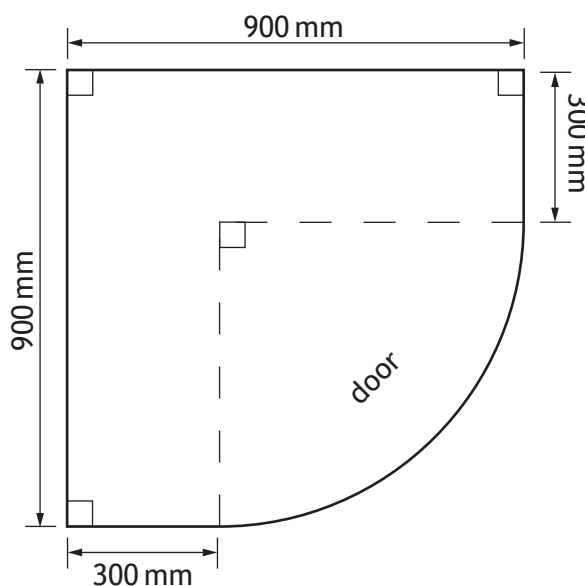
2



* X 7 4 4 7 5 0 2 1 4 *

8. (continued)

The second design that Zuzanna is considering is the offset quadrant shower tray shown below.



The offset quadrant design has quarter of a circle forming part of the edge.

- (c) Zuzanna will choose the design that gives the greater area.

Which design will Zuzanna choose, the pentagonal or the offset quadrant shower tray?

4

Use your working to justify your answer.

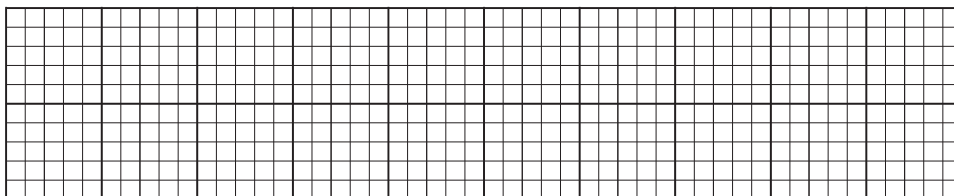
[END OF QUESTION PAPER]



* X 7 4 4 7 5 0 2 1 5 *

ADDITIONAL SPACE FOR ANSWERS

Additional diagram for use in Question 4 (c).



* X 7 4 4 7 5 0 2 1 6 *

MARKS

DO NOT
WRITE IN
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MARGIN

ADDITIONAL SPACE FOR ANSWERS



* X 7 4 4 7 5 0 2 1 7 *

MARKS

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* X 7 4 4 7 5 0 2 1 8 *

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* X 7 4 4 7 5 0 2 1 9 *

ADDITIONAL SPACE FOR ANSWERS

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* X 7 4 4 7 5 0 2 2 0 *