N5

National Qualifications 2015

Mark

X744/75/02

Lifeskills Mathematics
Paper 2

WEDNESDAY, 29 APRIL
2:10 PM – 3:50 PM

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.

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.

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.

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.

PB

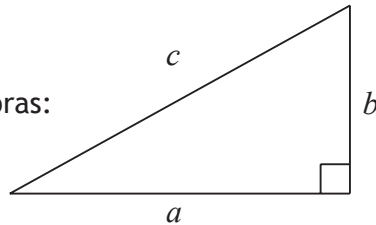**FORMULAE LIST**

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

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

Theorem of Pythagoras:

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

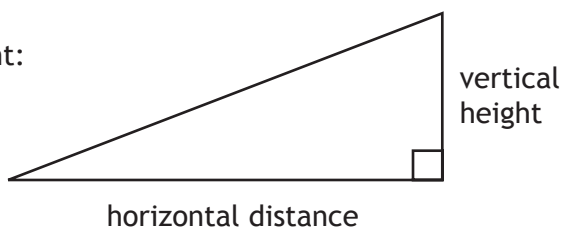Volume of a cylinder: $V = \pi r^2 h$

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

$$\text{gradient} = \frac{\text{vertical height}}{\text{horizontal distance}}$$
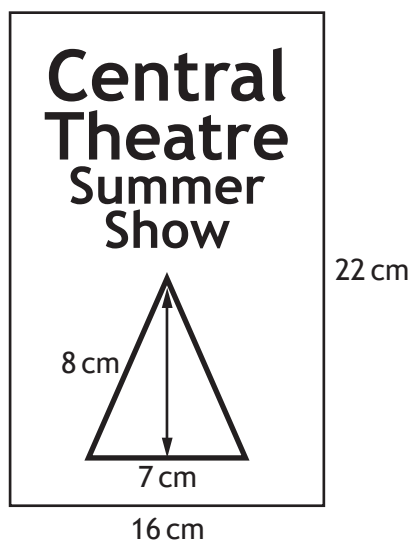
Total marks — 55

Attempt ALL questions

1. Publicity material is to be designed for a theatre show that is being sponsored by a local company.

All the publicity material must feature the company logo.

The company logo is in the shape of a triangle.

The designer is to produce a small "flyer" and a large poster.

The designer produces a sketch for the flyer as shown.

Central Theatre
Summer Show

22 cm

8 cm

7 cm

16 cm

(a) The ratio of the dimensions in the poster to those in the flyer is 7:2.

Calculate the dimensions of the logo as it will appear on the poster. **2**

(b) The design brief specifies that the company logo must be between 9% and 12% of the area of any publicity material.
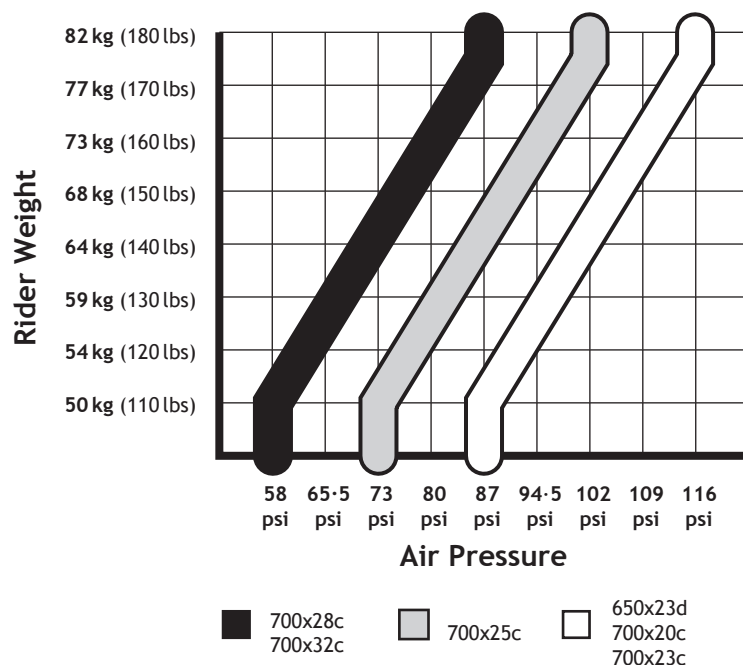
Does this design fit these specifications? **4**
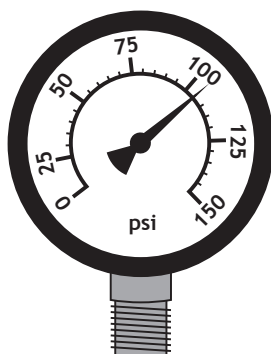
[Turn over

2. Patryk is a keen cyclist.

Before Patryk goes for a cycle he checks the recommended air pressure for his tyres using the graph below.

Patryk weighs 73 kilograms and he is using 700 × 23C tyres.

The gauge below shows the reading when he checks his front tyre.

(a) State any adjustment Patryk should make so that his tyre has the correct air pressure.

3

2. **(continued)**

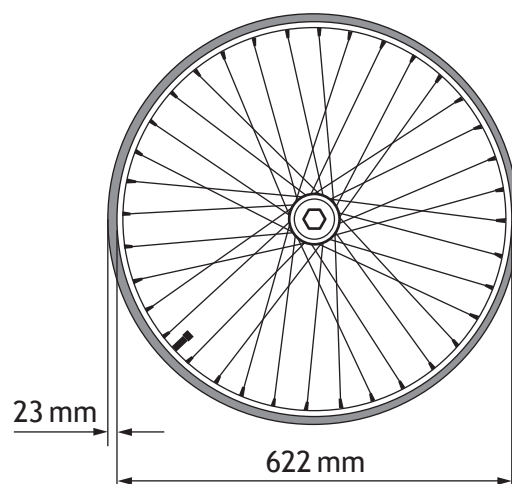Patryk has a bicycle trip computer.

To calibrate the computer he must enter the circumference of the front tyre of his bicycle.

The diameter of the rim is 622 millimetres and the depth of the tyre is 23 millimetres as shown in the diagram below.

23 mm

622 mm

(b) What value should Patryk enter into his bicycle trip computer?
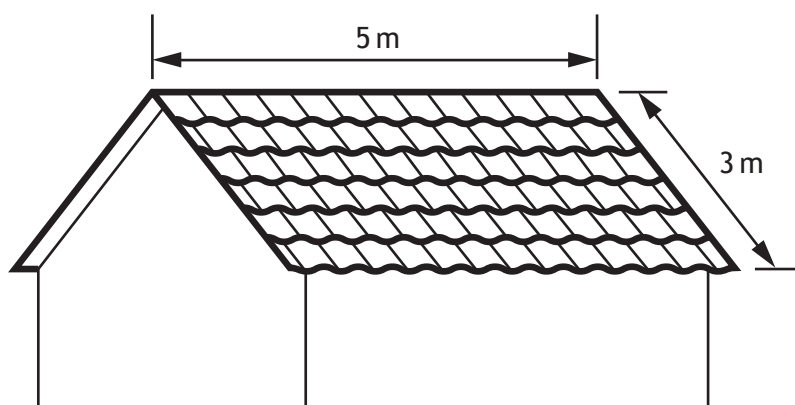
Round your answer to the nearest millimetre. **3**

[Turn over

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3. Mrs Smith has decided to get the roof of her extension re-slated.

She contacts a local roofing contractor to get an estimate.

Each side of the roof has dimensions 5 m by 3 m as shown.

The builder gives her a quote for the replacement slates.

He uses the following method to work out his estimate:

- calculate the area of one side

- double this (total area)

- double again (overlapping slates)

- multiply by 16 (to get the number of slates required)

- add on 15% (for cuts and breakages).

The cost of each slate is 97 pence.

He rounds his estimate to the nearest hundred pounds.

The builder tells Mrs Smith he will "throw in" any additional materials for free.

(a) How much is the estimate for replacement slates?   **3**

3. (continued)

Mrs Smith asks for a total price including labour.

The builder works this out using the following:

Strip and clean roof — 8 hours

Replace slates — 1 square metre/ hour

Rate — £22 per hour.

(b) How much will the labour costs be?

2

(c) Mrs Smith will go ahead with the work if the written estimate is less than £2,500.

Complete the written estimate below.

Written Estimate

Client   *Mrs Smith*
....

Estimated cost of slates   £
....

Labour Costs   £
....

Sub-total   £
....

VAT at 20%   £
....

....

TOTAL COST   **£**
....

Will Mrs Smith accept the builder's estimate?

2

4. A seaplane flies from an airport on a bearing of 050° at a speed of 170 mph for 36 minutes.

It then turns onto a new bearing of 190° and flies at the same speed for a further 1 hour 12 minutes.

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

Use a scale of 1 cm:20 miles **4**

N

↑

●
Airport

4. (continued)

The seaplane continues at the same speed back to the airport.

(b) Use the scale drawing to determine the distance and bearing of the airport from the seaplane.

2

The seaplane burns fuel at 32 litres per hour.

Aviation fuel costs £2·04 per litre.

(c) Calculate the cost of the fuel for the complete journey.

4

5. The local youth club runs a weekly tuck shop. Any profit that is made is donated to a local charity.

The stem and leaf diagram shows their weekly takings for the first 6 months of this year.

```
0 | 5  7  7  8  9  9
1 | 0  2  5  6  6  7  8  8  8  9
2 | 0  1  1  2  3  5
3 | 0  4
```

n = 24   3 | 4 represents £34

(a) (i) State:

the median

the lower quartile

the upper quartile.   **2**

(ii) Using the above data construct a boxplot in the space provided.

(An additional diagram, if required, can be found on *Page fourteen*)   **2**

5. (continued)

(b) The monthly profits, in pounds, for the second 6 months of this year, are recorded below.

$$22 \quad 16 \quad 25 \quad 19 \quad 18 \quad 20$$

Calculate:

(i) the mean monthly profit.

1

(ii) the standard deviation.

Round your answer to the nearest penny.

3

(c) The mean profit and standard deviation, for the same period, the previous year was £16·25 and £2·40 respectively.

Make two valid comparisons between these.

2

(d) The local youth club thinks that the mean donations have increased by 25%.

Are they correct?

2

[Turn over

6. In a diving competition there are seven judges.

Each judge gives the diver a raw score out of 10.

Each dive has a difficulty rating.

A rule is then applied which calculates the diver's final score.

The rule is:

- discard the lowest and highest raw scores

- work out the mean of the remaining raw scores

- multiply the mean by 3/5

- multiply this value by the difficulty rating

- round to 1 decimal place.

The table shows the judges' raw scores for two competitors.

Diver	Difficulty rating	Judges' raw scores						
		1	2	3	4	5	6	7
Cheryl	3·2	9·0	9·5	9·0	8·5	7·5	8·5	8·0
Ha-lin	3·5	8·5	7·0	7·5	8·5	8·0	7·5	9·0

(a) In this round, Ha-lin's final score is 16·8.

Is this higher or lower than Cheryl's final score? **4**

(b) Cheryl will win the competition if she achieves a final score of 16·9 in her last dive.

(i) If she maintains her mean score from part (a), what is the minimum level of difficulty of dive Cheryl would need to win the competition? **3**

6 (b) (continued)

    (ii) If Cheryl chooses a dive with a difficulty rating of 3·4, what mean score would she need to receive from the judges to win the competition?
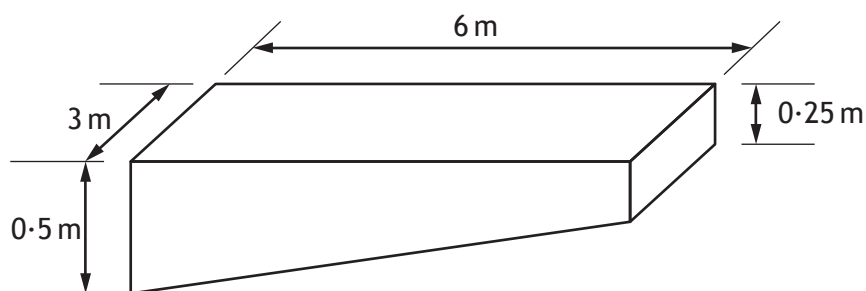
3

(c) Regulations state that a 10 metre high diving platform must be:

- 6 m in length
- 3 m in width
- 0·25 m deep at front edge, and 0·5 m at back edge
- made of concrete.

The diagram shows one such platform.

Will 7 m^3 of concrete be enough to build the platform?
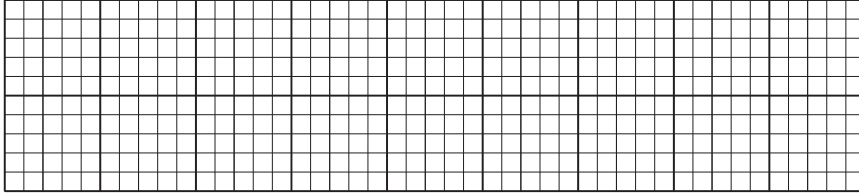
4

[END OF QUESTION PAPER]

ADDITIONAL SPACE FOR ANSWERS

Additional Diagram for Question 5(a)

ADDITIONAL SPACE FOR ANSWERS

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DO NOT WRITE ON THIS PAGE