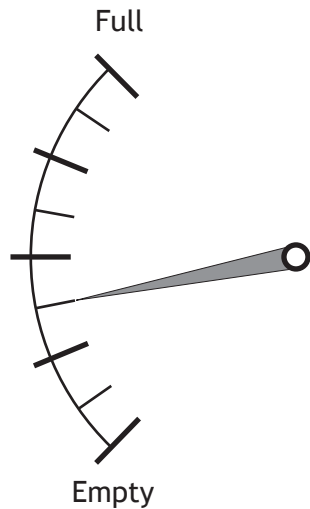


Total marks — 35  
Attempt ALL questions

MARKS DO NOT WRITE IN THIS MARGIN

1. Carol knows that she can travel 280 miles on a full tank of fuel. She is making a trip of 110 miles.

The diagram below shows the car's fuel gauge



Does she have enough fuel to make the journey?

Show working to justify your answer.

2

2. Usain flies from London to Moscow for a business meeting.

The plane leaves London at 1845.

The flight takes 3 hours and 40 minutes.

Moscow time is 4 hours ahead of London.

It should take 45 minutes to collect his luggage and clear security.

His company arranges for a driver to collect him from Moscow Airport.

At what time should the driver expect to collect Usain?

2

[Turn over



3. Freddie and Kamal work in a warehouse stacking shelves.  
A section of the warehouse has 5 shelves; each shelf is 10 metres in length.  
The shelves are currently stocked as shown below.

Shelf 1	Box A (7 m)
Shelf 2	Box B (5 m)
Shelf 3	Box C (6 m) Box D (3 m)
Shelf 4	Box E (4 m) Box F (3 m)
Shelf 5	Box G (2 m)

A new delivery of Box H (6 m), Box I (5 m), Box J (3 m), Box K (4 m), Box L (1 m) arrives to be stored in this section of the warehouse.

These new boxes need to be stored on different shelves from the existing stock.

The existing stock can be re-arranged to create space for the new delivery.

By writing the letters A to L in the diagram below, show how Freddie and Kamal can fit all the boxes onto the shelves.

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

2

Shelf 1	
Shelf 2	
Shelf 3	
Shelf 4	
Shelf 5	



4. A company orders a batch of washers with a thickness of  $2.4 \pm 0.05$  mm. A quality control inspector takes a sample from the batch of washers. The thicknesses, in mm, of the washers in this sample are shown below.

2.44, 2.37, 2.36, 2.45, 2.35

2.35, 2.44, 2.43, 2.34, 2.40

2.40, 2.41, 2.39, 2.38, 2.46

2.41, 2.39, 2.53, 2.36, 2.37

For the batch to be accepted, at least 88% of the washers in this sample must be within tolerance.

Will the batch be accepted?

3

5. A shop sells Ice Cola in 330 millilitre cans. An individual can costs 66 pence. Complete the shelf label for Ice Cola below to show the price per litre.



2

330 ml	equivalent to	1 litre
<u>66p</u>		_____

[Turn over

MARKS

DO NOT  
WRITE IN  
THIS  
MARGIN

6. Mhairi buys 200 shares for £700.

When she decides to sell them, the share price has dropped to £2.75 per share.

She has to pay a fee of  $2\frac{1}{2}\%$  of her selling price when she sells her shares.

Calculate the loss that she has made.

4

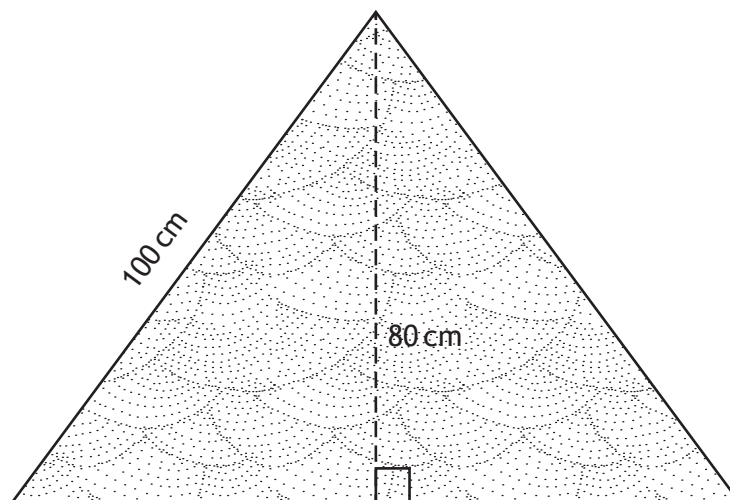


\* X 7 4 4 7 5 0 1 0 6 \*

MARKS

DO NOT  
WRITE IN  
THIS  
MARGIN

7. Lucy has a scarf in the shape of an isosceles triangle with dimensions as shown below.



Lucy wants to sew ribbon along all three edges of the scarf.

She has 3.5 metres of ribbon.

Does Lucy have enough ribbon for the scarf?

Show all working and justify your answer.

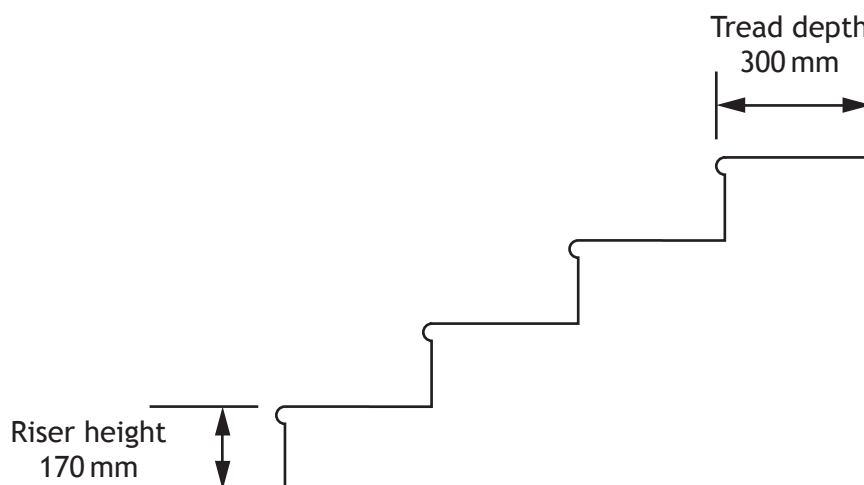
4

[Turn over



\* X 7 4 4 7 5 0 1 0 7 \*

8. The diagram below shows a staircase Mark intends to install in his home. The dimensions of the riser and tread of each step are shown.



For safety reasons, these rules must be applied.

- Twice the riser height plus the tread depth should be  $625 \text{ mm} \pm 15 \text{ mm}$ .
- The gradient of each step should be less than  $\frac{1}{2}$ .

Mark thinks that this staircase will meet both of these rules.

Is Mark correct?

Use your working to justify your answer.

5



9. Novak is going to buy a new computer system. He researches online to find the prices from different retailers.

Retailer	Keyboard	Monitor	Computer Tower	Mouse	Printer
Easy Comp	50	130	130	15	95
ABC	45	135	140	20	75
Compact	30	125	180	25	120
Hardy's	70	130	165	15	125
Tonda	35	115	150	20	80
Disme	40	120	180	10	105

All prices are in £s

- (a) Novak needs to buy one of each item. He is happy to buy these from different retailers.

What is the minimum total cost for his new computer system?

1

- (b) Novak cannot afford to pay for his computer system all at once.

Disme can provide a finance package to buy the complete computer system.

The deposit is 10% of the cash price, followed by 12 payments of £40.

He chooses to buy the complete computer system from Disme using their finance package.

How much more than the minimum total will this cost him?

4

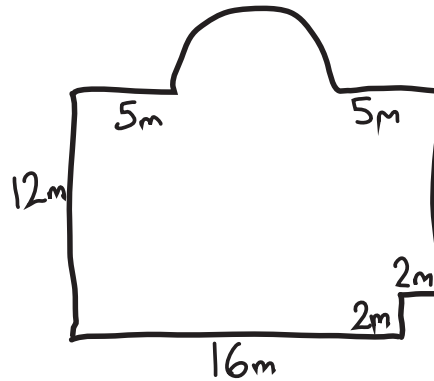
[Turn over



10. A hotel is redecorating their function room which includes a semi-circular stage area.

They plan to lay a hardwood floor.

A sketch of the floor plan of the room is shown below.



- (a) Calculate the area of the floor in the hotel's function room.

Use  $\pi = 3 \cdot 14$ .

4

- (b) Hardwood flooring comes in packs of  $4\text{m}^2$  and is sold at £67.95 per pack.

Calculate the cost for the hotel to floor their function room.

2

[END OF QUESTION PAPER]



\* X 7 4 4 7 5 0 1 1 0 \*



Total marks — 55  
Attempt ALL questions

MARKS DO NOT  
WRITE IN  
THIS  
MARGIN

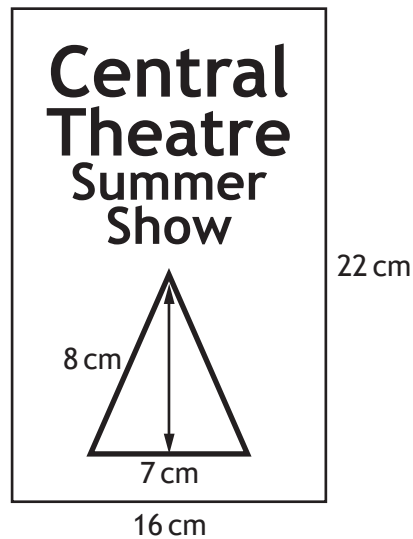
1. Publicity material is to be designed for a theatre show that is being sponsored by a local company.

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.



- (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

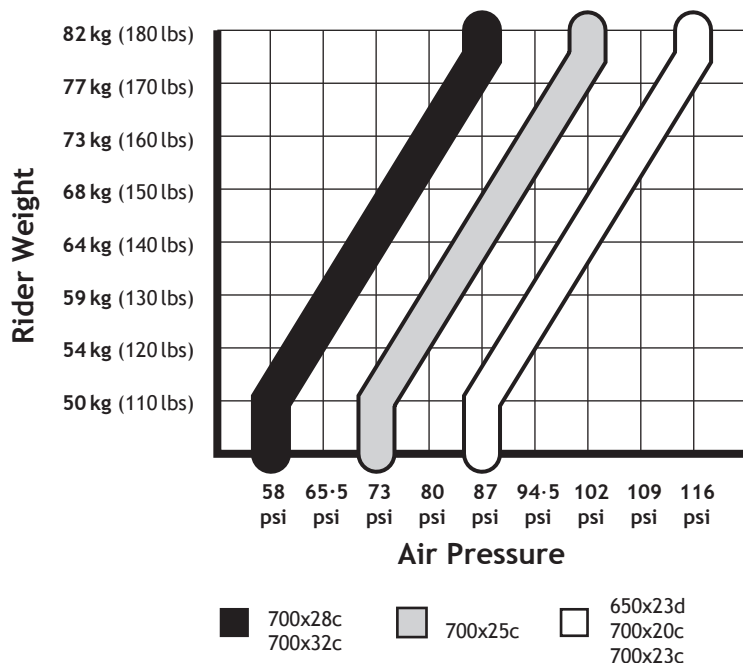
[Turn over



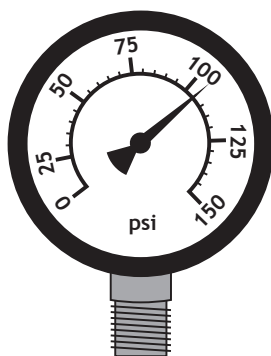
2. Patryk is a keen cyclist.

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.

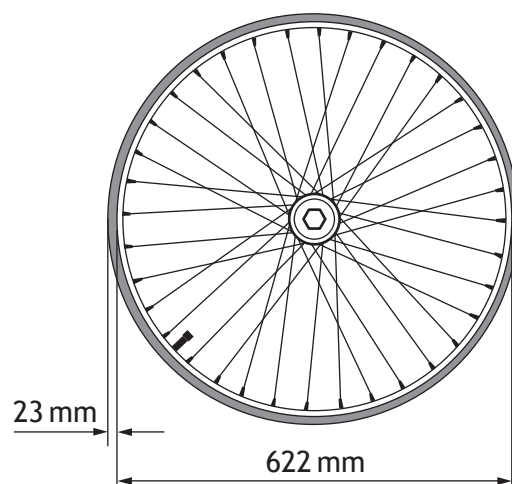
3

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.



(b) What value should Patryk enter into his bicycle trip computer?

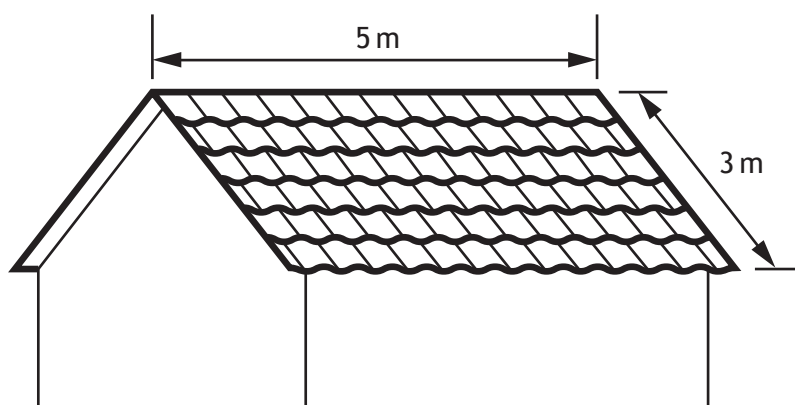
Round your answer to the nearest millimetre.

3

[Turn over



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)

MARKS DO NOT WRITE IN THIS MARGIN

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	<i>Mrs Smith</i>
Estimated cost of slates	£
Labour Costs	£
Sub-total	£
VAT at 20%	£
<b>TOTAL COST</b>	<b>£</b>

Will Mrs Smith accept the builder's estimate?

2

[Turn over



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

It then turns onto a new bearing of  $190^\circ$  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



4. (continued)

MARKS DO NOT WRITE IN THIS MARGIN

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

[Turn over



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

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.



$n = 24$

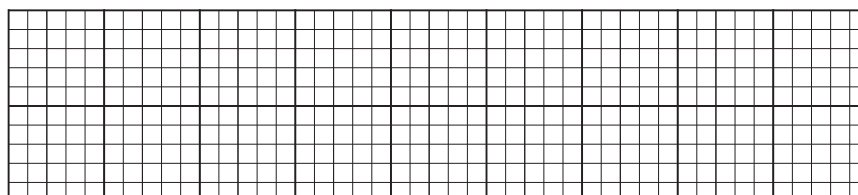
3 | 4 represents £34

- (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)

MARKS  
DO NOT  
WRITE IN  
THIS  
MARGIN

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

22 16 25 19 18 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

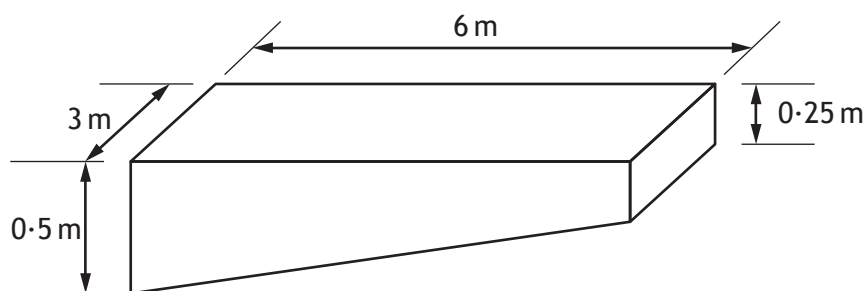
(c) Regulations state that a 10 metre high diving platform must be:

- 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  $7 \text{ m}^3$  of concrete be enough to build the platform?

4



[END OF QUESTION PAPER]

