

Surname <i>StemUp Model Solution</i>	Centre Number	Candidate Number
Other Names		0



GCSE – NEW

3310U10-1



S17-3310U10-1

**MATHEMATICS – NUMERACY
UNIT 1: NON-CALCULATOR
FOUNDATION TIER**

THURSDAY, 25 MAY 2017 – MORNING

1 hour 30 minutes

ADDITIONAL MATERIALS

The use of a calculator is not permitted in this examination.
A ruler, a protractor and a pair of compasses may be required.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen. Do not use gel pen or correction fluid.

You may use a pencil for graphs and diagrams only.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** the questions in the spaces provided.

If you run out of space, use the continuation page at the back of the booklet, taking care to number the question(s) correctly.

Take π as 3.14.

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

In question 4(a), the assessment will take into account the quality of your linguistic and mathematical organisation, communication and accuracy in writing.

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	4	
2.	9	
3.	5	
4.	9	
5.	5	
6.	4	
7.	3	
8.	8	
9.	6	
10.	9	
11.	3	
Total	65	

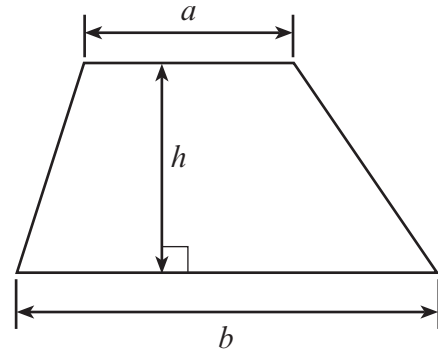
3310U101
01



MAY173310U10101

Formula List - Foundation Tier

Area of trapezium $= \frac{1}{2} (a + b)h$



1. Owen buys houses in Wales. He then rents them out to people.
He uses a website to find the average price for a detached house in 6 different counties.

Average House Prices (November 2015)

County	Average house price (£)
Anglesey	171 684
Carmarthenshire	158 973
Powys	199 998
Cardiff	269 885
Neath Port Talbot	144 762
Ceredigion	182 852

- (a) Calculate the difference between the average house price in the most expensive county and least expensive county.
Give your answer correct to the nearest £1000. [2]

Most expensive: Cardiff £269 885

Least expensive: Neath Port Talbot £144 762

Difference = 269 885 - 144 762 = 125 123

£125 123 = £125 000 to the nearest £1000

- (b) Owen says,

"The average house price in four of the counties is less than £180 000."

Is Owen correct?

Give a reason for your answer. [1]

No, Owen is not correct. Only 3 counties (Anglesey, Carmarthenshire and

Neath Port Talbot) have an average house price less than £180 000, not 4.

- (c) Which of the following is the best approximation for the average house price in Powys?
Circle your answer. [1]

£199 990

£199 900

£199 000

£190 000

£200 000

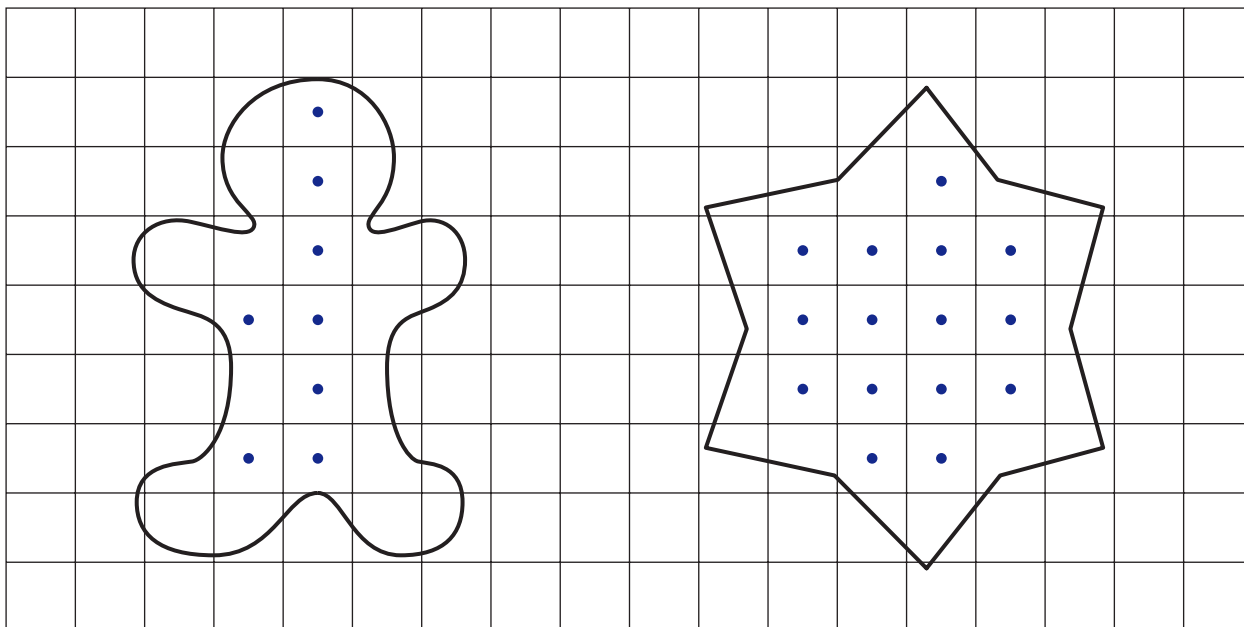


2. (a) Tamsin and Sophie make biscuits.
They plan to cover the top surface of each biscuit with the same thickness of chocolate.

The biscuits are shown on the centimetre squared grid below.

Tamsin's biscuit

Sophie's biscuit



Tamsin thinks that Sophie's biscuit will need more chocolate to cover it.
Estimate the area of each biscuit.
Decide whether or not Tamsin is correct.
Show all your working.

[3]

Tamsin: whole squares (·) = 8, part squares = 22, $22 \div 2 = 11$

Area of Tamsin's biscuit $\approx 8 + 11 = 19 \text{ cm}^2$

Sophie: whole squares (·) = 15, part squares = 19, $19 \div 2 = 9.5$

Area of Sophie's biscuit $\approx 15 + 9.5 = 24.5 \text{ cm}^2$

24.5 cm^2 is more than 19 cm^2 , so Sophie's biscuit has the bigger top.

Yes, Tamsin is correct: Sophie's biscuit will need more chocolate.



- (b) Tamsin and Sophie have carried out a survey to find which biscuits are the most popular. The four most popular biscuits are chocolate cookies, custard creams, jammy dodgers and digestives. Design a tally chart that Tamsin and Sophie could have used to collect their data and show their results. [3]

<i>Biscuit</i>	<i>Tally</i>	<i>Frequency</i>
<i>Chocolate cookies</i>		12
<i>Custard creams</i>		8
<i>Jammy dodgers</i>		14
<i>Digestives</i>		6
<i>Total</i>		40

- (c) Tomas makes rectangular biscuits. The top of each biscuit has a surface area of 30 cm^2 . Tomas covers the surface area of the top of each biscuit with chocolate. The chocolate costs 3 pence per 10 cm^2 . Calculate the cost of covering 200 of these biscuits with chocolate. [3]

$$30 \text{ cm}^2 = 3 \text{ lots of } 10 \text{ cm}^2$$

$$\text{Cost for 1 biscuit} = 3 \times 3\text{p} = 9\text{p}$$

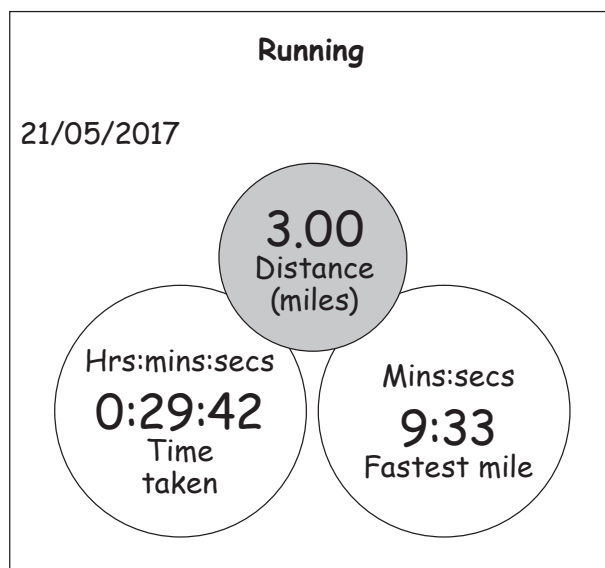
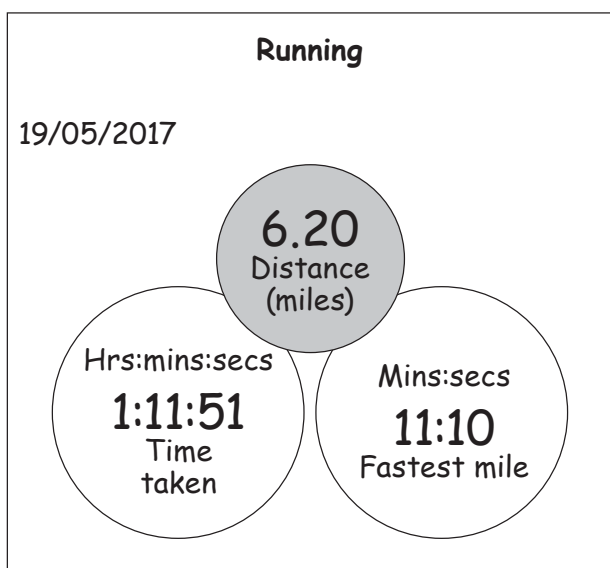
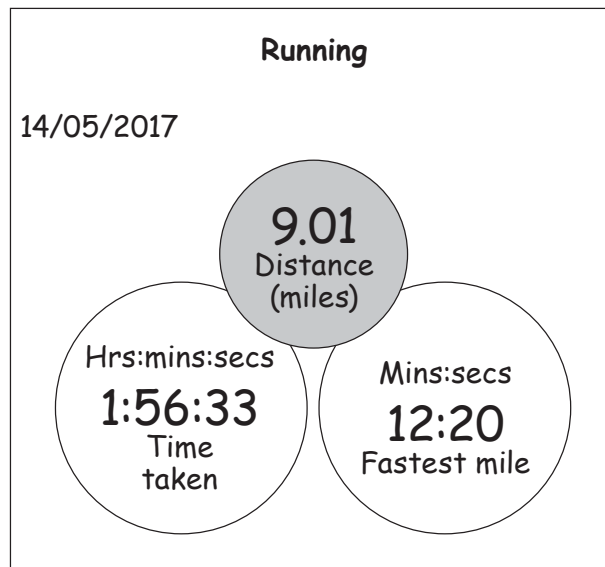
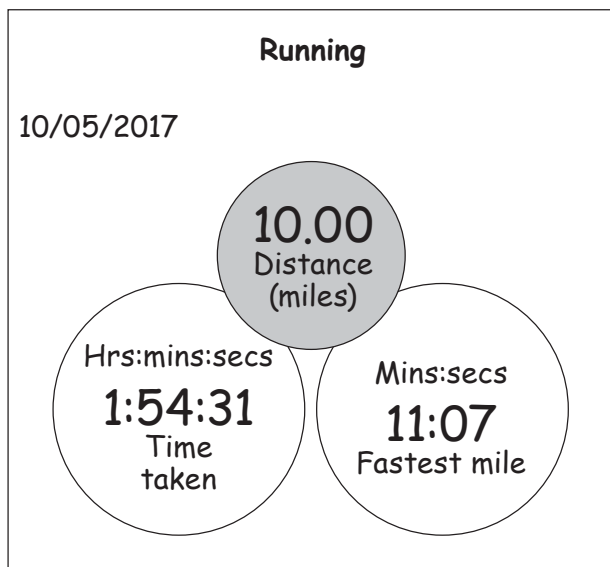
$$\text{Cost for 200 biscuits} = 200 \times 9\text{p} = 1800\text{p}$$

$$1800\text{p} = \text{£}18.00$$

$$\text{Cost} = \text{£}18.00$$



3. Jo is a keen runner.
She tracks each of her runs using an app on her phone.
Information about her last four runs is shown below.



(a) In Jo's last four runs,

- (i) what was the shortest distance that she ran?

[1]

3 miles

- (ii) what was the longest time that she ran for?

[1]

1 hour 56 minutes 33 seconds (1:56:33)



- (b) Circle either TRUE or FALSE for each of the following statements about Jo's **last 4 runs**. [2]

Jo always ran for more than half an hour	TRUE	<u>FALSE</u>
Jo ran a total of more than 25 miles	<u>TRUE</u>	FALSE
Jo's fastest mile run was under 10 minutes	<u>TRUE</u>	FALSE
Jo's furthest run took the longest time	TRUE	<u>FALSE</u>

Shortest time 0:29:42 < 30 mins. Total = 10 + 9.01 + 6.20 + 3.00 = 28.21 miles

Fastest mile 9:33 < 10 mins. Furthest run (10 miles) took 1:54:31 < 1:56:33

- (c) On the **10th May 2017**, Jo set a target time of 1 hour 45 minutes to complete her run. By how many minutes and seconds did Jo miss her target? [1]

Time taken on 10th May = 1:54:31, target = 1:45:00

1:54:31 - 1:45:00 = 0:09:31

Jo missed her target by 9 minutes 31 seconds.



4. Mrs Henry works part time in a factory.
The amount of time for each day that she worked last week is shown in the table.

Day	Hours worked
Tuesday	$3\frac{1}{2}$
Wednesday	4
Thursday	$4\frac{1}{2}$
Friday	5
Saturday	3

Mrs Henry's pay is calculated using the following:

- Tuesday to Friday:
- £8 per hour for the first 15 hours
 - £9 per hour for any extra hours
- Saturday:
- double the usual rate of £8 per hour

- (a) *In this part of the question, you will be assessed on the quality of your organisation, communication and accuracy in writing.*

Work out Mrs Henry's total pay for last week.
You must show all your working.

[6 + 2 OCW]

Hours worked Tuesday to Friday:

$$3\frac{1}{2} + 4 + 4\frac{1}{2} + 5 = 17 \text{ hours}$$

$$\text{Pay for the first 15 hours} = 15 \times \text{£}8 = \text{£}120$$

$$\text{Extra hours} = 17 - 15 = 2 \text{ hours}$$

$$\text{Pay for the extra hours} = 2 \times \text{£}9 = \text{£}18$$

$$\text{Pay for Tuesday to Friday} = \text{£}120 + \text{£}18 = \text{£}138$$

$$\text{Saturday rate} = \text{double } \text{£}8 = 2 \times \text{£}8 = \text{£}16 \text{ per hour}$$

$$\text{Pay for Saturday} = 3 \times \text{£}16 = \text{£}48$$

$$\text{Total pay} = \text{£}138 + \text{£}48 = \text{£}186$$



Mrs Henry's total pay for last week was £186.00

(b) On another week Mrs Henry was paid £188.

She puts 20% of her weekly wage into a savings account.

How much did Mrs Henry put into her savings account that week?
Circle your answer.

[1]

£9.40

£18.80

£34.20

£37.60

£150.40

10% of £188 = £18.80, so 20% = 2 × £18.80 = £37.60



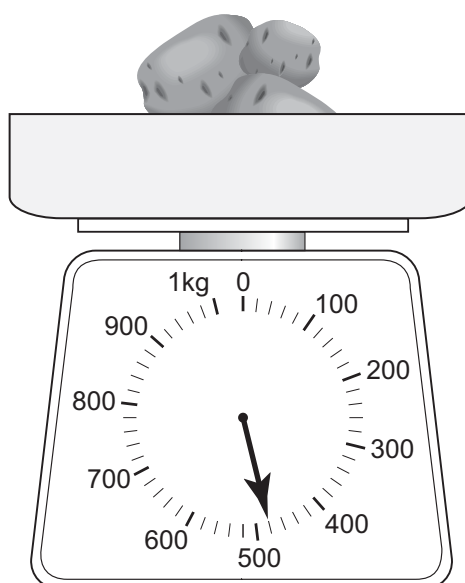
5.



Huw is going to make vegetable soup for 6 people.

A recipe for 2 people uses 10 ounces of potatoes.

He has placed some potatoes on his weighing scales as shown below.



The weighing scales display the mass in grams.

Huw knows that 1 ounce is approximately 28 grams.

How many **more** grams of potatoes does Huw need to make vegetable soup for **6 people**? [5]

6 people is 3 times 2 people, so potatoes needed = $3 \times 10 = 30$ ounces

Mass needed = $30 \times 28 \text{ g} = 3 \times 28 \times 10 = 84 \times 10 = 840$ grams

Reading on the scales = 480 grams

Extra mass needed = $840 - 480 = 360$ grams

Extra mass of potatoes needed is **360** grams



6. Siân wrote the following:

'For the last 7 days I have recorded the number of cars parked in my local car park at 10 a.m. each day. This is what I found.

- The car park always had some cars parked in it.
- The greatest number of cars was 11.
- The range was 8 cars.
- The median was 9 cars.
- The mode was 10 cars.
- On one day, there were 6 cars in the car park.
- On another day, there were 7 cars in the car park.'

Gareth asked,

'What was the mean number of cars in the car park at 10 a.m. for these 7 days?'

Complete Siân's reply to Gareth's question.

You must list the 7 numbers Siân recorded and show all your working.

'The mean number of cars in the car park at 10 a.m. for these 7 days was

8 cars.'

[4]

Greatest = 11 and range = 8, so smallest = $11 - 8 = 3$

Mode = 10, so 10 appears at least twice: 10, 10, 11 are the top three

Median = 9, so the middle (4th) number is 9

The other two numbers are 6 and 7

The 7 numbers are: 3, 6, 7, 9, 10, 10, 11

Total = $3 + 6 + 7 + 9 + 10 + 10 + 11 = 56$

Mean = $56 \div 7 = 8$ cars



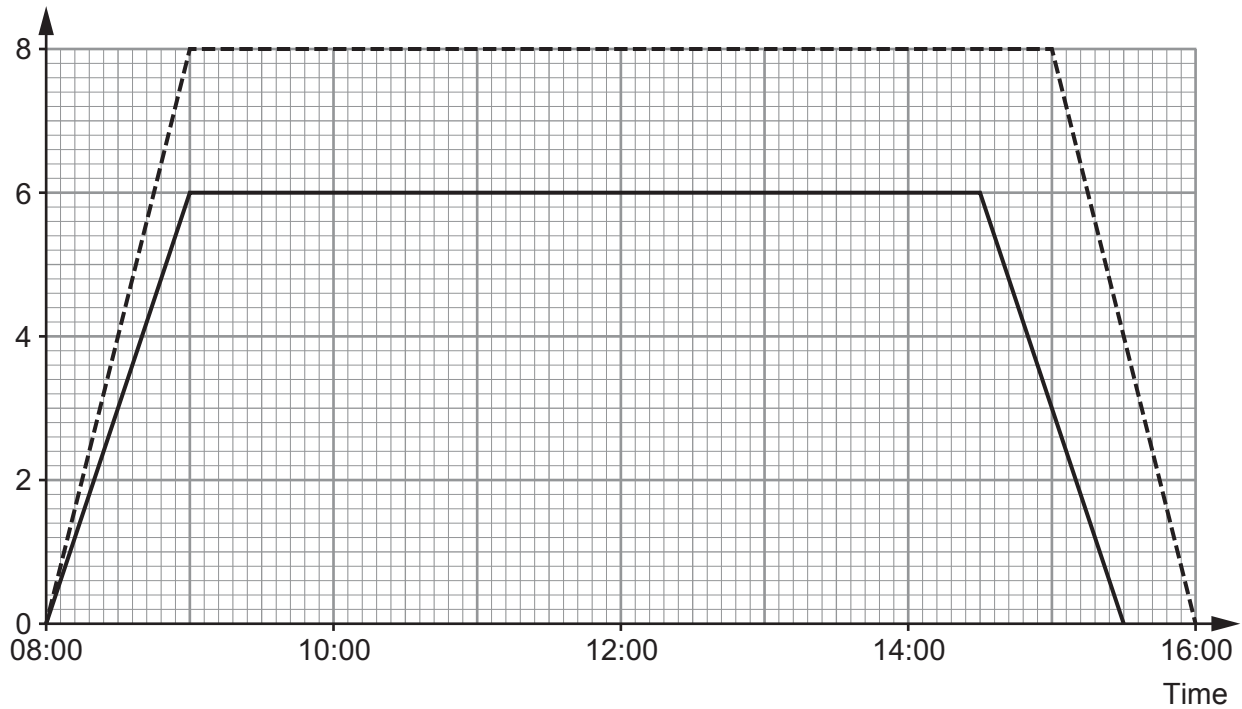
7. Eleri and Yvon are sisters.
They both live at *Cwm Uchel*.
They do not go to the same school.
The graph represents each of their journeys to school and back.

Key:

----- represents Eleri's journeys

————— represents Yvon's journeys

Distance from home (km)



- (a) At what time did Yvon arrive home from school?
Circle your answer.

[1]

14:45

15:15

15:30

15:45

16:00



- (b) Eleri cycles along a straight road to school and back.
How far does she cycle when going to school and back in one day?
Circle your answer.

[1]

6 km

8 km

9 km

12 km

16 km

Eleri: 8 km to school + 8 km back = 16 km

- (c) Martha looks at the graph and says,

'The school Eleri attends is 2 km from Yvon's school.'

Is this true?

Certainly true

☐

Certainly false

☐

Can't tell

☒

Give a reason for your answer.

[1]

Can't tell. The graph only shows each girl's distance from home, not the direction. The schools could be in different directions, e.g. up to $8 + 6 = 14$ km apart, so we cannot say they are 2 km apart.



8.



Maes Alun Camping Charges



Tents covering ground area:

- less than or equal to 12 m^2 cost £14 per night
- greater than 12 m^2 cost £16 per night

AND

Charge per person: £4 per night

Stay 5 nights and get the next night **completely free**.
This means **no charge** for tents or people on **every 6th night**.

Rhodri and Lars are planning a camping holiday, staying at *Maes Alun Camping*.

They are going to:

- take only one tent between them,
- take a tent covering a rectangular ground area, measuring 2.5 metres by 4.4 metres,
- both stay for a total of 12 nights.

Their holiday is just 8 weeks away.

They **each** plan to save £15 per week from now until their holiday in 8 weeks' time.

Will the amount they save be enough to pay for their holiday?

You must show all your working.

[8]

$$\text{Ground area of tent} = 2.5 \times 4.4 = 2 \times 4.4 + 0.5 \times 4.4 = 8.8 + 2.2 = 11\text{ m}^2$$

11 m^2 is less than 12 m^2 , so the tent costs £14 per night

12 nights: the 6th and 12th nights are free, so they pay for 10 nights

$$\text{Cost of tent} = 10 \times £14 = £140$$

$$\text{Cost for 2 people} = 2 \times 10 \times £4 = £80$$

$$\text{Total cost of the holiday} = £140 + £80 = £220$$

$$\text{Amount saved} = 2 \text{ people} \times 8 \text{ weeks} \times £15 = 2 \times £120 = £240$$

£240 is more than £220



*Yes, the amount they save (£240) will be enough to pay for
their holiday (£220), with £20 left over.*



9. Kari is making a jigsaw puzzle.
She has designed the pattern on a piece of paper.
Kari plans to make each piece of the jigsaw a different colour.

Part of her plan is shown below.

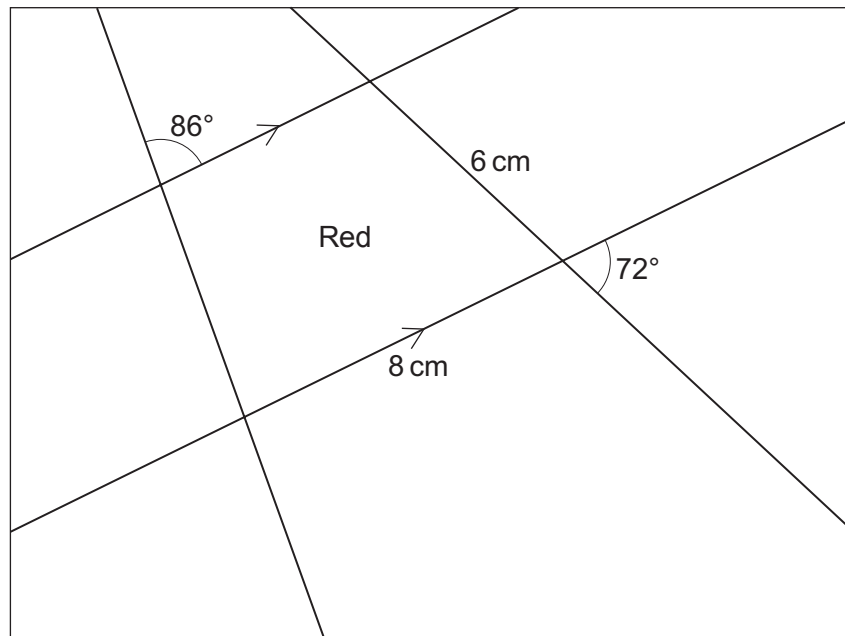


Diagram not drawn to scale

Kari now sketches a diagram of the red piece of the jigsaw, which is shown below.
She shows some extended lines and indicates all the angles she needs to find.

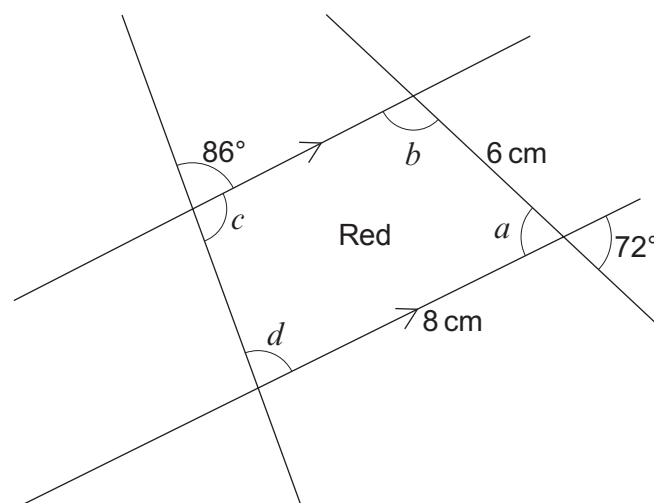


Diagram not drawn to scale



Find the 4 missing angles in the red piece of the jigsaw.
Draw the red piece of Kari's jigsaw accurately.
One side has been drawn for you.

[6]

$$a = 72^\circ \text{ (vertically opposite angles are equal)}$$

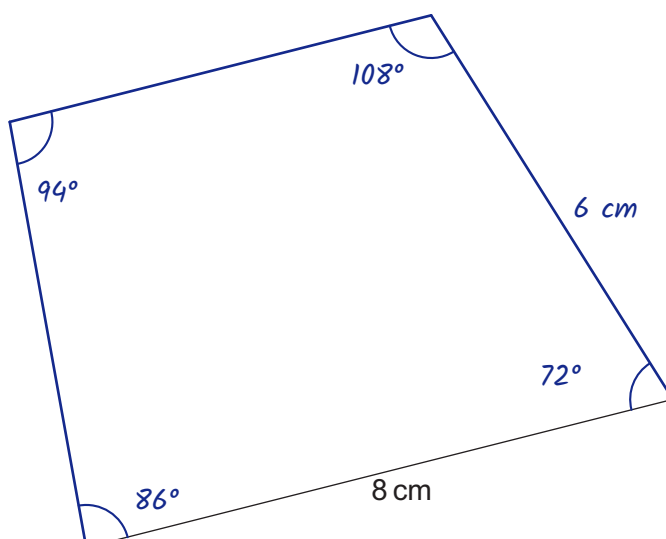
$$b = 180^\circ - 72^\circ = 108^\circ \text{ (co-interior angles add up to } 180^\circ)$$

$$c = 180^\circ - 86^\circ = 94^\circ \text{ (angles on a straight line add up to } 180^\circ)$$

$$d = 180^\circ - 94^\circ = 86^\circ \text{ (co-interior angles add up to } 180^\circ)$$

$$a = 72^\circ, \quad b = 108^\circ, \quad c = 94^\circ, \quad d = 86^\circ$$

Space for drawing the red piece of jigsaw:



10. Lazar wants to send a package to Germany.
He looks at pricing charts for three different companies, *ParcelMax*, *DirectGo* and *Pack2save*.

ParcelMax

Total cost =
Sum of the 3 dimensions in cm $\times$ £0.60

DirectGo

Total cost =
Volume measured in $\text{cm}^3 \times$ £0.01

Pack2save

Total cost =
Total area of all 6 faces measured in $\text{cm}^2 \times$ £0.02

Lazar's parcel is a cuboid measuring 10 cm by 20 cm by 30 cm.

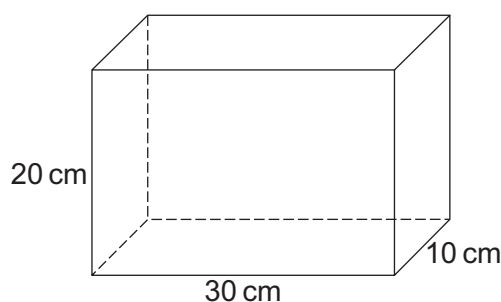


Diagram not drawn to scale

Find the cost of sending the parcel for each of the three different companies.
Give each of your answers in pounds (£).

(a) *ParcelMax*

[2]

$$\text{Sum of the 3 dimensions} = 10 + 20 + 30 = 60 \text{ cm}$$

$$\text{Total cost} = 60 \times \text{£}0.60 = \text{£}36$$

ParcelMax costs £36

(b) *DirectGo*

[3]

$$\text{Volume} = 10 \times 20 \times 30 = 6000 \text{ cm}^3$$

$$\text{Total cost} = 6000 \times \text{£}0.01 = \text{£}60$$



DirectGo costs £60

(c) Pack2save

[4]

Faces: $10 \times 20 = 200 \text{ cm}^2$, $20 \times 30 = 600 \text{ cm}^2$, $10 \times 30 = 300 \text{ cm}^2$

There are 2 of each face:

Total area = $2 \times (200 + 600 + 300) = 2 \times 1100 = 2200 \text{ cm}^2$

Total cost = $2200 \times £0.02 = £44$

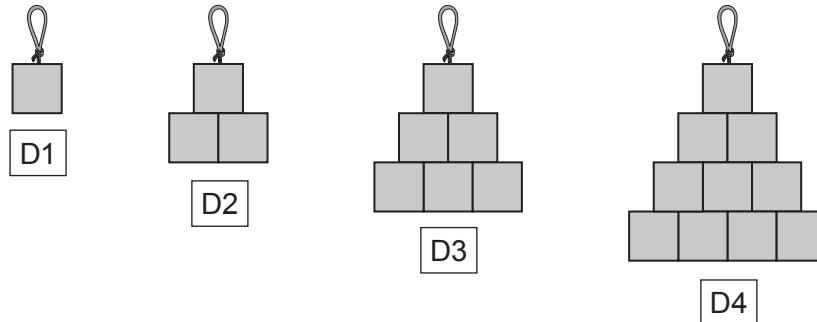
Pack2save costs £44



11. Ollie has a job in a workshop that makes decorations.

He makes decorations using small squares of stained glass.

Ollie has made the following decorations.



He labels the first decoration D1.

He labels the next 3 decorations in order, D2, D3 and D4.

He continues to make decorations and labels following this pattern.

- (a) After making decoration D5, Ollie notices he only has 10 small squares of stained glass left.

How many **more** squares of stained glass will Ollie need to make decoration D6? [2]

$$D1 = 1, D2 = 1 + 2 = 3, D3 = 6, D4 = 10, D5 = 10 + 5 = 15$$

$$D6 = 6 + 5 + 4 + 3 + 2 + 1 = 21 \text{ squares}$$

$$\text{More squares needed} = 21 - 10 = 11$$

- (b) Ollie uses a rule to work out how many squares he needs for each decoration. He states that to make decoration D10 he would need 55 squares.

Is Ollie correct?

You must show your working.

[1]

$$D10 = 10 + 9 + 8 + 7 + 6 + 5 + 4 + 3 + 2 + 1 = 55 \text{ squares}$$

Yes, Ollie is correct.

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