

Surname	Centre Number	Candidate Number
Other Names		0



GCSE LINKED PAIR PILOT

4361/01

APPLICATIONS OF MATHEMATICS

UNIT 1: Applications 1

FOUNDATION TIER

A.M. FRIDAY, 13 June 2014

1 hour 30 minutes

ADDITIONAL MATERIALS

A calculator will be required for this paper.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

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.

Take π as 3.14 or use the π button on your calculator.

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.

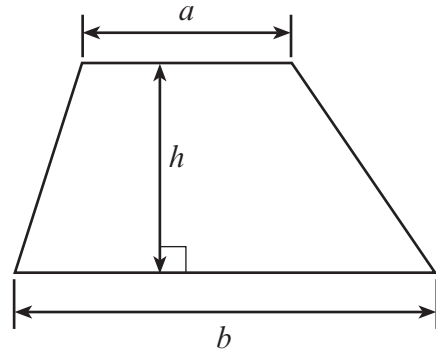
The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question 4(a).

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	12	
2.	7	
3.	9	
4.(a)	10	
4.(b)(c)	7	
5.	7	
6.	5	
7.	4	
8.	4	
9.	7	
10.	8	
Total	80	

Formula List

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



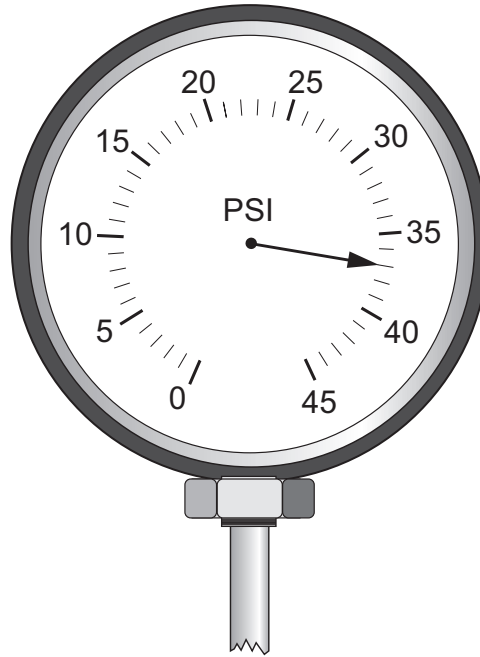
Volume of prism = area of cross-section \times length



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1. (a) Tyre pressure is measured in PSI (pounds per square inch).
The pump in the diagram shows the pressure in a tyre of a bicycle.
What is the pressure in the tyre?

[1]



Pressure in the tyre is PSI

(b) The sketch below represents part of a cycle route.

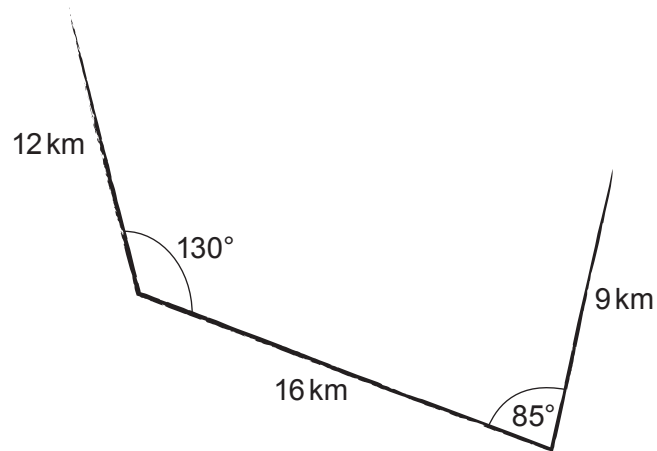
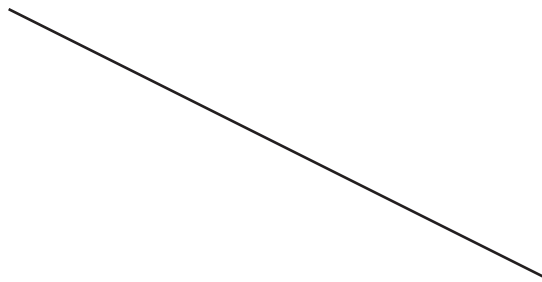




Diagram not drawn to scale

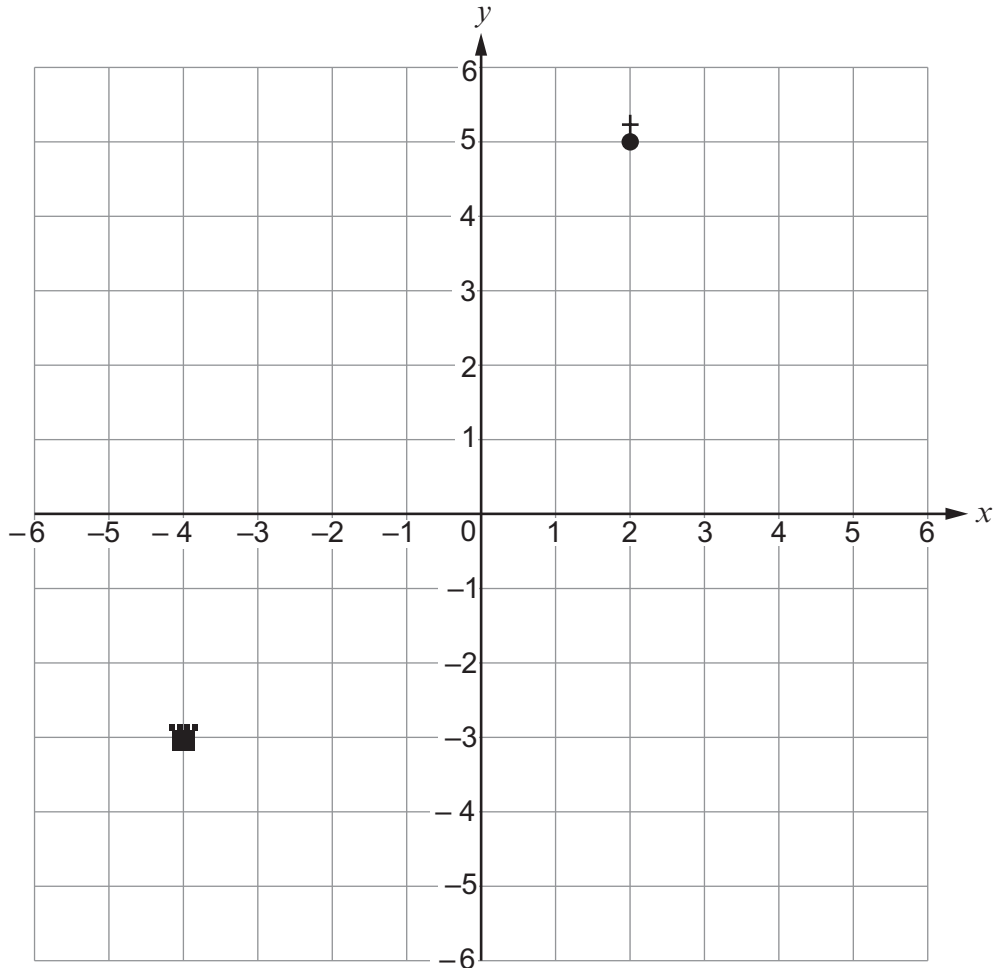
Draw an accurate diagram for the part of the cycle route shown.
Use a scale of 1 cm to represent 2 km.
The line representing the 16 km has already been drawn for you.

[4]



- (c) Several places can be seen from the cycle route.

A church  and castle  are shown on the grid below.



- (i) What are the coordinates of the church and castle shown on the grid? [2]

The coordinates of the church are (..... ,)

The coordinates of the castle are (..... ,)

- (ii) A skating park can also be seen from the cycle route.
The coordinates of the skating park are (3, 0).
Plot this point on the grid above and label the point S.

[1]

(d) The average times to cycle between these places are given in the table below.

	Church	Castle	Skating park
Church		1.5 hours	20 minutes
Castle	1.5 hours		$\frac{3}{4}$ hour
Skating park	20 minutes	$\frac{3}{4}$ hour	

Use the times given above to answer the following.

- (i) How long does it take to cycle from the castle to the skating park?
Give your answer in minutes.

[1]

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..... minutes

- (ii) How long, **in total**, will it take to cycle
- from the castle to the skating park
 - then from the skating park to the church
 - and finally from the church back to the castle?

[3]

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2.



Christopher is tiling his kitchen walls.

- (a) He needs 25 boxes of tiles.
The price of one box is £27.60.
The tile shop has a special offer of

Buy one box and get another box half price

Christopher makes use of this special offer.
How much does Christopher pay for the 25 boxes of tiles?

[5]

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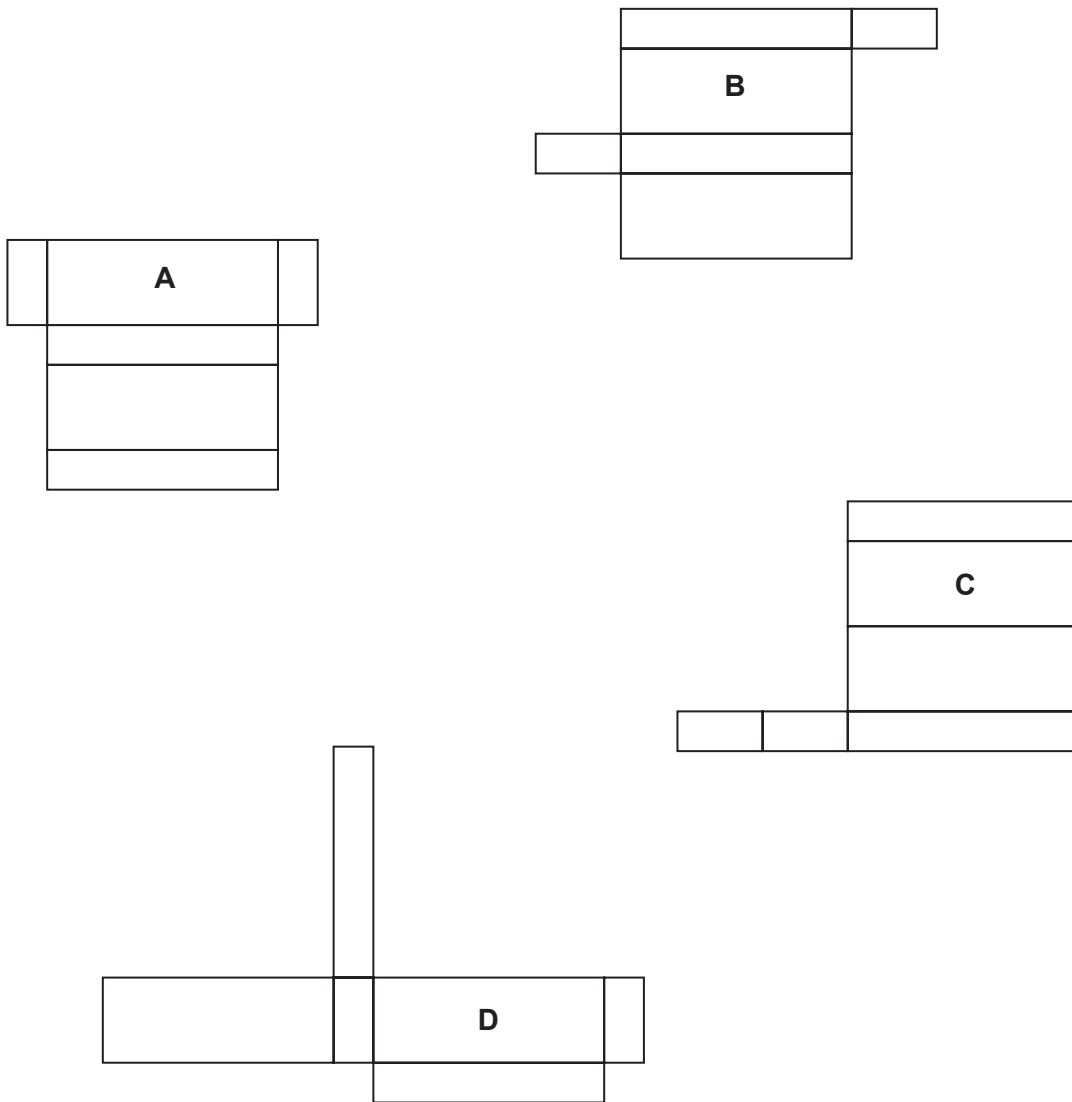
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- (b) The boxes that contain the tiles are cuboids.
 Circle the possible **nets** that could be used to form the boxes for the tiles.

[2]



3. Jimmy recorded the following 7 waiting times, in minutes, for meals at a local restaurant.

17 24 19 30 19 25 20

(a) Find the mean, median, mode and range of the 7 waiting times. [7]

Mean

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Median

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Mode

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Range

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(b) Jimmy recorded an extra waiting time at the restaurant.
This made the range of the 8 waiting times equal to the mode of the 8 waiting times.
Find a possible value for this extra waiting time. [2]

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4. (a) *You will be assessed on the quality of your written communication in this part of the question.*

A committee organised an end of Year 11 party in a local hotel.

The costs for the party were:

- A room hired for 5 hours at a cost of £24 per hour.
- A band hired at a cost of £165 for the evening.
- Balloons and decorations for the room at a cost of £356.
- A meal at a cost of £27 per person.

The tickets for the party were sold at £35 each.
154 tickets were sold.

After the committee had paid all of the costs for the party, the money left over was given to a charity.

How much money was given to the charity?

Show all your working.

[10]

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- (b) The dance floor was in the shape of a rectangle, as shown below.

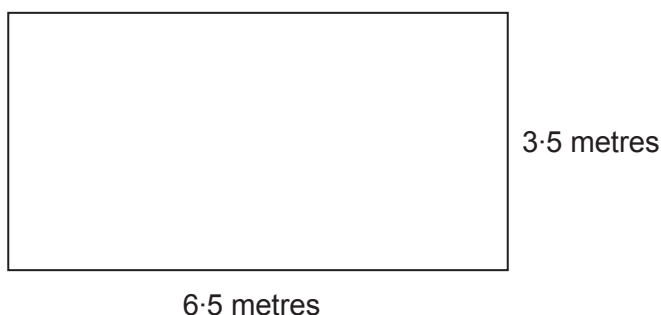


Diagram not drawn to scale

Calculate the area of the dance floor, giving the units of your answer.

[3]

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- (c) The cost of hiring a limousine for the party is calculated using

**£295
plus
£2.80 per mile**

- (i) Calculate the cost of hiring a limousine for travelling a distance of 20 miles.

[2]

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- (ii) Write a formula for the cost of hiring a limousine.
Use C for the cost, in pounds, and m for the distance, in miles.

[2]

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5. A new logo for a sports club has been designed to go onto their kit. The design consists of **two squares** joined to **an equilateral triangle** as shown below.

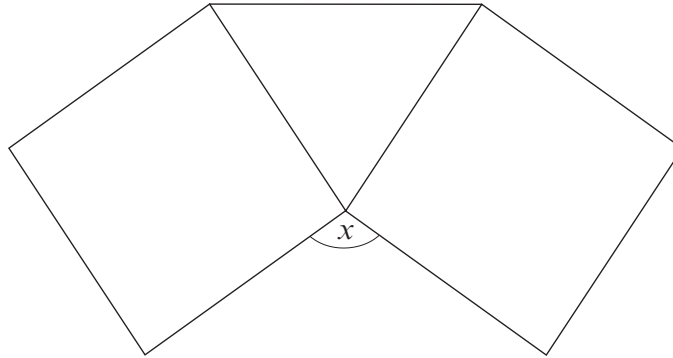


Diagram not drawn to scale

- (a) Each square has sides of length 27 mm.
Find the perimeter of the logo, **giving your answer in cm.**

[4]

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- (b) Find the size of angle x .

[3]

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6. (a) Red and green buoys are used to aid navigation of boats. They often have flashing lights placed on them.
Whilst out sailing, Dewi notices that the light on a green buoy flashes every 8 seconds and the light on a red buoy flashes every 6 seconds.
Dewi sees them flash at the same time.
How many seconds later will he see the lights flash together again? [2]

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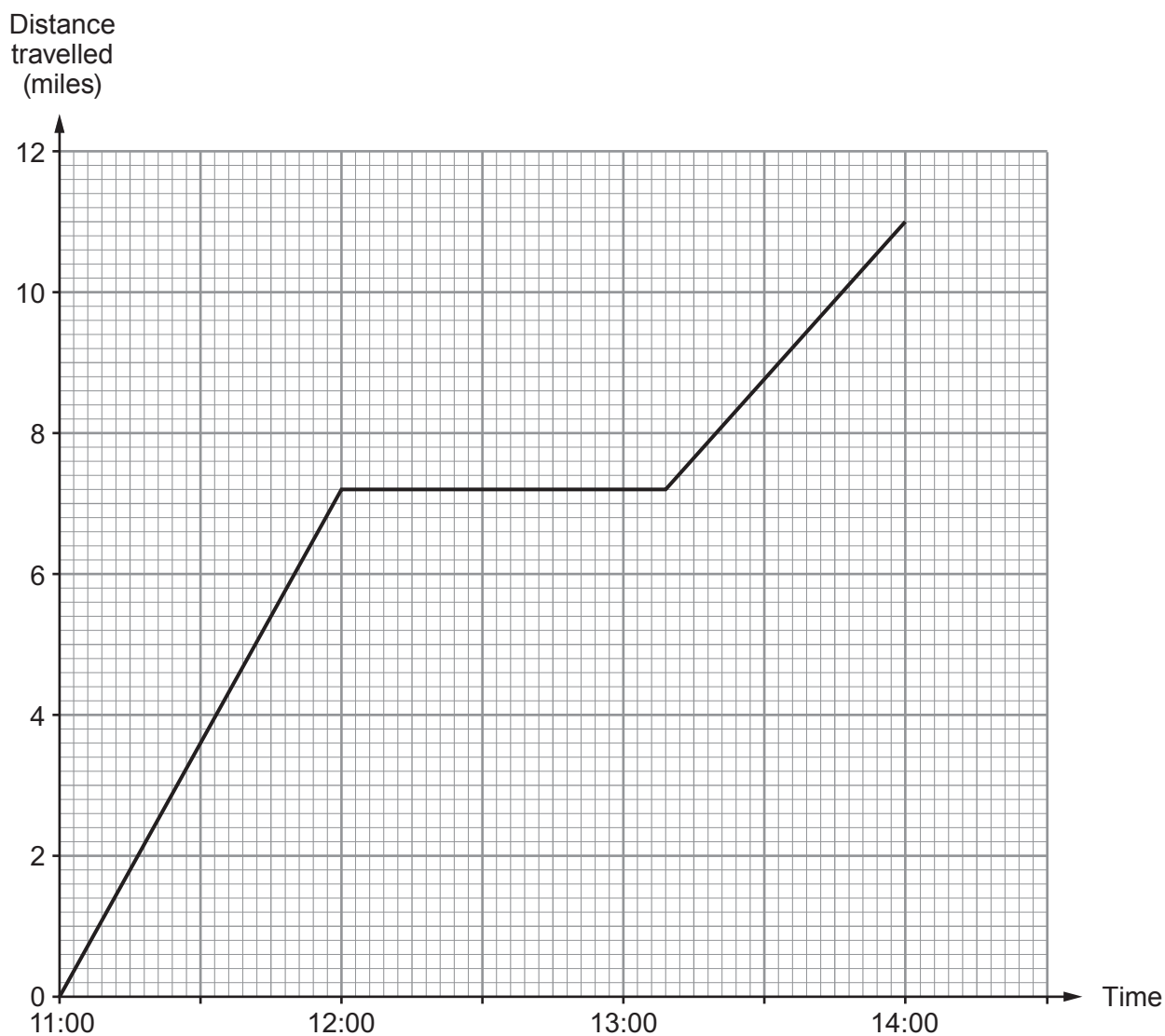
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(b) The travel graph below represents Dewi's journey whilst sailing.



(i) How far did he travel in the first half hour? [1]

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(ii) Dewi stops for lunch and drops the anchor to stop his boat from drifting. For how many minutes did he stop? [1]

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(iii) Without carrying out any calculations, decide whether Dewi is travelling faster before or after his stop. You must give a reason for your answer. [1]

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7. A survey is to be carried out to find the popularity of buying books with various age groups of the general population.

The survey is carried out by asking people questions as they come out of a book shop. Two questions from the survey questionnaire are shown below.

1. How old are you? Put a tick in the box.	under 20	<input type="checkbox"/>
	20 to 30	<input type="checkbox"/>
	30 to 40	<input type="checkbox"/>
	older than 40	<input type="checkbox"/>
2. Do you buy books? Put a tick in the box.	Yes	<input type="checkbox"/>
	No	<input type="checkbox"/>

- (a) Explain why this may be a biased survey. [1]

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- (b) State a criticism about the design of question 1 in the survey. [1]

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- (c) Write a question with a selection of answer boxes, to find out how much people are prepared to pay for a paperback book. [2]

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8. Bikes are built around a frame.



Below is a scale drawing of a bike frame.

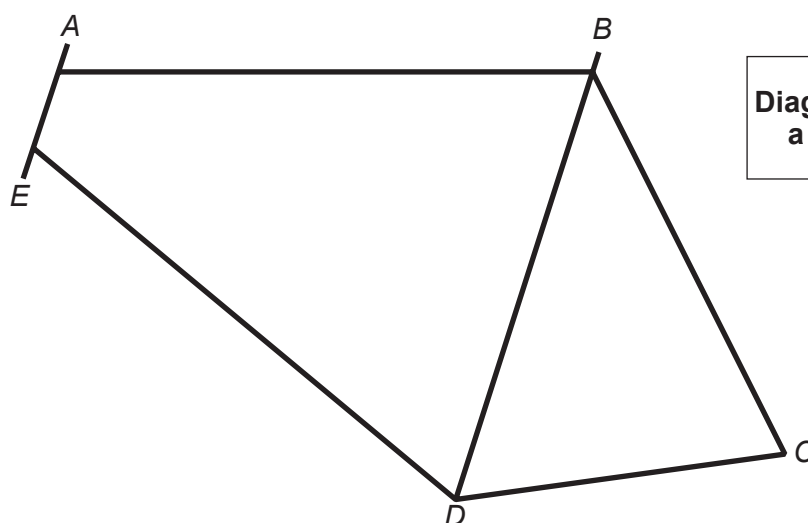


Diagram drawn to
a scale of 1:8

- (a) Write down an approximate length of the cross bar AB .
Give your answer in **metres**.

[2]

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- (b) Is AE parallel to BD ?
Use angle facts to give a reason for your answer.

[2]

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9. (a) Jasmine makes necklaces.
Each necklace is made using 34 red beads, 10 yellow beads and 6 black beads.

Jasmine has 918 red beads.
She does not have any yellow or black beads.
Jasmine plans to use all her red beads to make necklaces.

How many yellow and black beads does Jasmine need to buy?
You must show all of your working.

[4]

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- (b) Jasmine also makes bracelets.
Each bracelet is made using 24 purple beads and 9 green beads.
Jasmine buys her beads in bags of 6 purple beads and bags of 6 green beads.
She wants to buy the smallest number of bags of beads and **must** use all the beads she buys.
How many bags of purple beads and green beads does Jasmine need to buy? [3]

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10. Lizzie's job is to calculate solutions for a data analysis company which involves working with algebraic equations and expressions.

Process the following for Lizzie.

- (a) Factorise $35x + 15$. [1]

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- (b) Simplify $3a + 5b - 19a - 16b$. [1]

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- (c) Simplify $3(3d - 2e) - (d - e)$. [2]

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- (d) Lizzie knows that a solution to the equation $x^3 - 2x - 40 = 0$ lies between 3 and 4. Find this solution correct to one decimal place. [4]

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END OF PAPER