

7. Factorise $x^2 - x - 20$, and hence solve $x^2 - x - 20 = 0$. [3]

.....

.....

.....

.....

.....

8. A sketch of the graph of the straight line $y = 7x + 2$ is shown below.

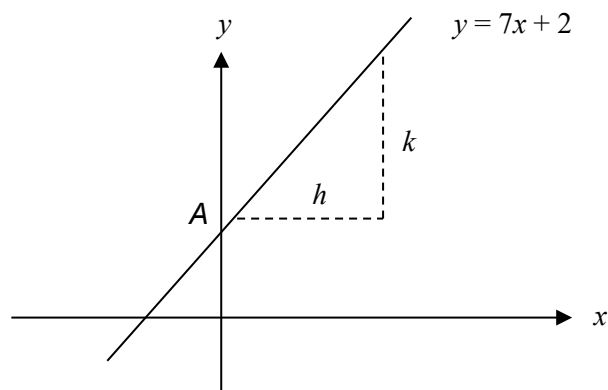


Diagram not drawn to scale

- (a) What are the coordinates of the point A, where the line cuts the y -axis?
Circle your answer.

[1]

(2, 0) (7, 0) (0, 2) (0, 7) (7, 2)

- (b) When h is equal to 1 unit, what is the value of k ?
Circle your answer.

[1]

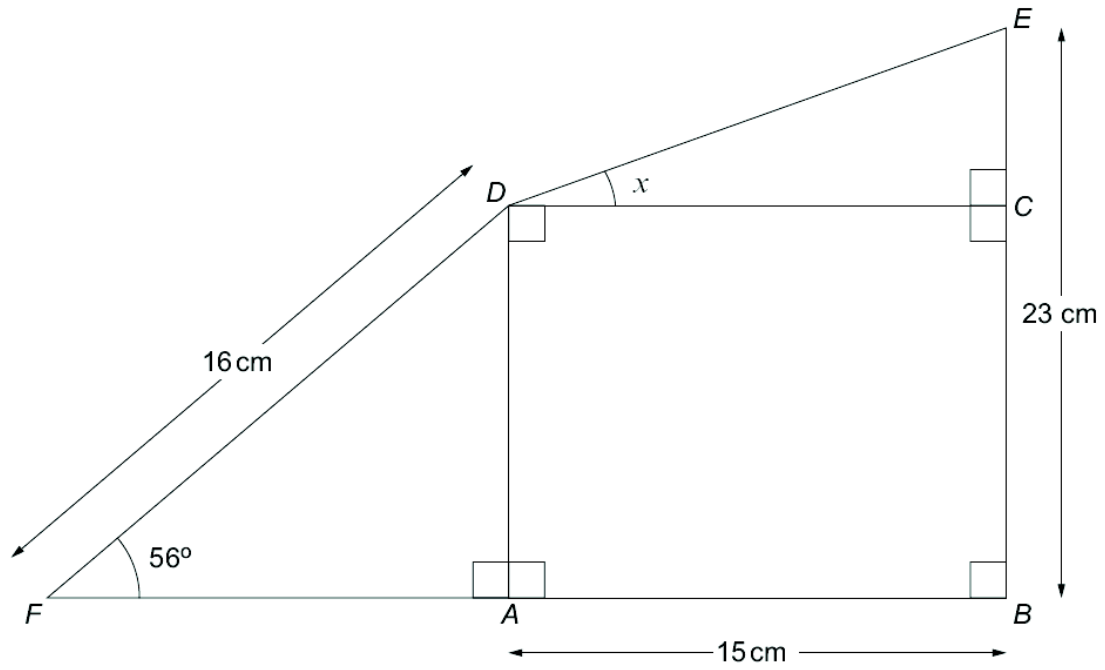
2 units 7 units 1 unit 3.5 units 14 units

- (c) Which of the following equations is an equation of a straight line that is perpendicular to $y = 7x + 2$?
Circle your answer.

[1]

$y = 7x + 3$ $y = \frac{x}{7} + 3$ $y = 7x + 3$ $y = -\frac{x}{7} + 3$ $y = 2x + 7$

9.

*Diagram not drawn to scale*

- (a) Calculate the length AD . [3]

.....

.....

.....

.....

- (b) *You will be assessed on the quality of your organisation, communication and accuracy in writing in this part of the question*

Find the size of the angle x .

[5]

.....

.....

.....

.....

.....

.....

.....

.....

10. (a) Make c the subject of the following formula. [2]

$$\frac{1}{a} = \frac{1}{b} + \frac{1}{c}$$

.....

.....

.....

.....

.....

.....

.....

- (b) Solve $3x^2 + 4x - 18 = 0$, giving your answers correct to two decimal places.
You must show all your working. [3]

.....

.....

.....

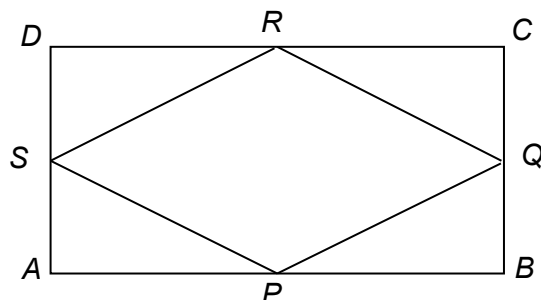
.....

.....

.....

.....

11. $ABCD$ is a rectangle. P , Q , R and S are the mid-points of the sides.



- (a) Prove that triangles APS and CRQ are congruent. [3]

.....

.....

.....

.....

.....

.....

.....

.....

.....

- (b) Use your proof in part (a) to decide what is the special name given to the quadrilateral $PQRS$.
Give your reason. [1]

.....

.....

.....

.....

12. The square and the sector of a circle shown below have equal areas.

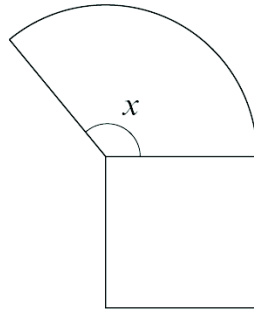


Diagram not drawn to scale

Calculate the size of angle x .

[3]

.....

.....

.....

.....

.....

.....

.....

.....

.....

- 13.** (a) Express $\frac{x}{x-3} - \frac{x}{x+6}$ as a single fraction in its simplest form. [3]

[illegible]

- (b) Simplify $\frac{49x^2 - 100}{14x + 20}$. [4]

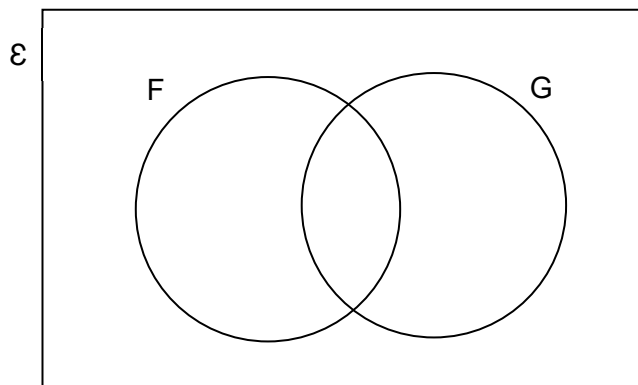
[illegible]

14. 30 students in a Year 11 class have decided which subjects they are going to study next year.

- 21 have decided to study French (F)
- 12 have decided to study German (G)
- 5 have decided not to study either French or German.

- (a) Complete the Venn diagram below to show this information.
The universal set \mathcal{E} contains all the students in the class.

[2]



.....

.....

- (b) Given that a student, chosen at random, has decided to study French, what is the probability that this student has also decided to study German? [2]

.....

.....

.....

15. Circle the correct answer for each of the following questions.

(a) $\tan 30^\circ$ is equal to,

$\frac{-1}{\sqrt{3}}$

$\frac{1}{\sqrt{3}}$

$\frac{2}{\sqrt{3}}$

$\frac{\sqrt{3}}{2}$

$\sqrt{3}$

[1]

(b) $\cos 150^\circ$ is equal to,

$\frac{1}{2}$

$\frac{\sqrt{3}}{2}$

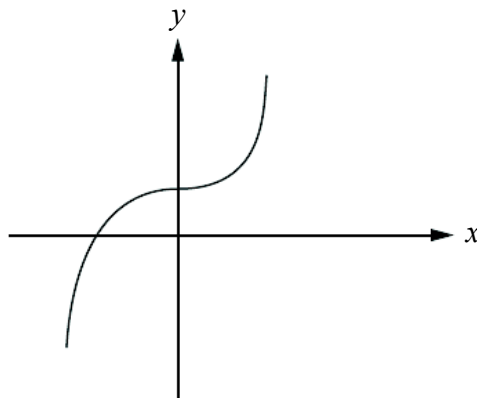
$-\frac{1}{2}$

$-\frac{\sqrt{3}}{2}$

$\frac{1}{\sqrt{3}}$

[1]

(c) The graph



can be represented by the equation,

$y = ax^3 + b$

$y = ax^2 + b$

$y = ax + b$

$y = \frac{a}{x} + b$

$y = ax^2 + bx$

where a and b are both positive numbers.

[1]

16. Using the axes below, **sketch** the graph of $y = \sin x + 3$ for values of x from 0° to 360° . [2]



17.

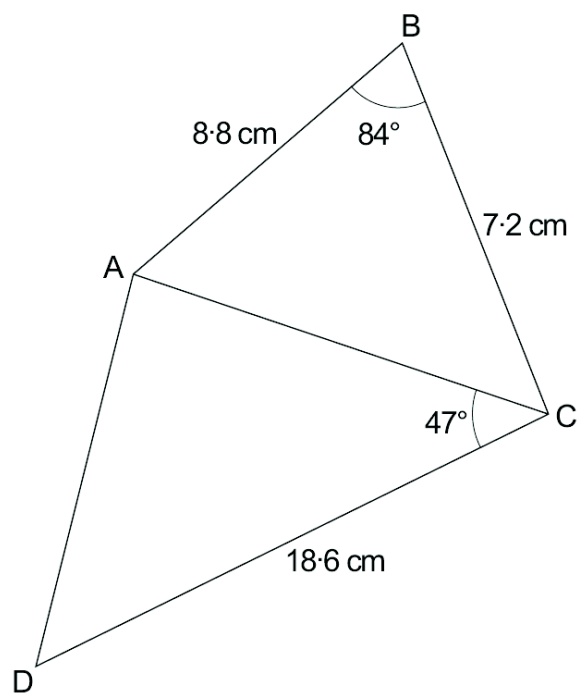


Diagram not drawn to scale

Calculate the area of triangle ACD .

[6]

This image shows a full page of white paper with horizontal dashed lines, typical of primary school writing paper. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

- 18.** A factory produces a very large number of beads which are either coloured red or coloured blue.
 The beads are identical in all other respects.
 The probability of a randomly chosen bead being red is 0.7.
 The beads are randomly packed in boxes of 20 beads.

(a) What is the expected number of red beads in a box? [1]

.....

.....

(b) A particular box is known to contain the expected number of red and blue beads.
 Two beads are chosen, at random, from this box without replacement.
 Show that there is less than an 8% chance that both beads are blue. [3]

.....

.....

.....

.....

(c) Two beads are chosen at random from the factory production line without replacement.
 Will the probability that both beads are blue be the same as for part (b)?
 You must justify your answer. [1]

.....

.....

.....

.....

.....

Candidate Name	Centre Number					Candidate Number				
						0				

**GCSE**

MATHEMATICS
UNIT 2: CALCULATOR-ALLOWED
INTERMEDIATE TIER

SPECIMEN PAPER SUMMER 2017**1 HOUR 45 MINUTES****ADDITIONAL MATERIALS**

A calculator will be required for this paper.

A ruler, protractor and a pair of compasses may be required.

INSTRUCTIONS TO CANDIDATES

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 in this booklet.

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.

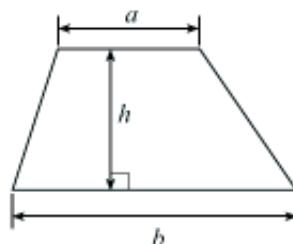
The number of marks is given in brackets at the end of each question or part-question.

The assessment will take into account the quality of your linguistic and mathematical organisation, communication and accuracy in writing in question **15**.

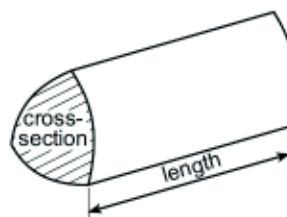
For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	3	
2.	3	
3.	4	
4.	4	
5.	7	
6.	3	
7.	6	
8.	4	
9.	5	
10.	5	
11.	5	
12.	3	
13.	4	
14.	4	
15.	8	
16.	3	
17.	3	
18.	6	
TOTAL	80	

Formula list

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



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



1. Find the size of angle x .

[3]

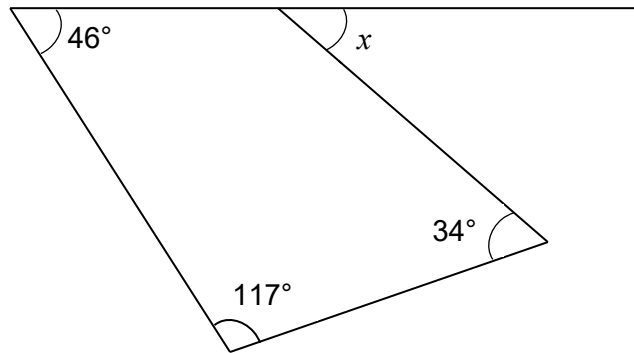


Diagram not drawn to scale

.....

.....

.....

.....

$x = \text{.....}^\circ$

2. A number machine is shown below.



Circle your answer in each of the following.

- (a) When the INPUT is 4 the OUTPUT is

33 -9 -17 9 17

[1]

- (b) When the OUTPUT is 15 the input is

38 -38 -12 12 -2

[1]

- (c) When the INPUT is n the OUTPUT is

$3n - 7$ $n - 21$ $7(n - 3)$ $-21n$ $3(n - 7)$

[1]