Mock Grade 8/9

Maths Booklet 2

Paper 3H
Calculator

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1 Here is a quadrilateral *PQRS*.

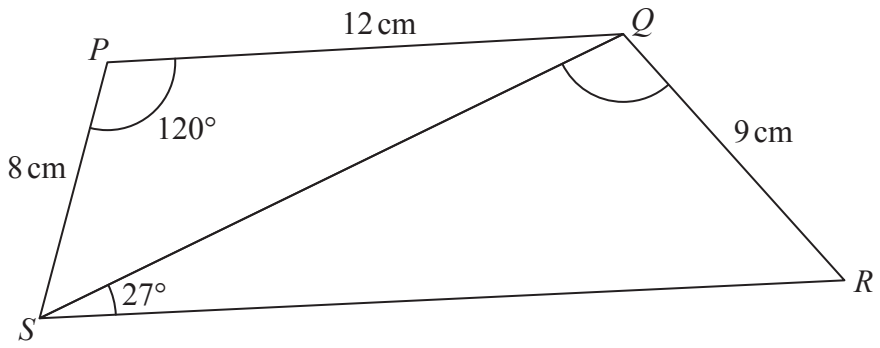


Diagram **NOT** accurately drawn

Angle *SRQ* is acute.

Work out the size of angle *SQR*.
Give your answer correct to 1 decimal place.

..... cm

(Total for Question 1 is 5 marks)

2. (*a*) Show that the equation $x^3 + 7x - 5 = 0$ has a solution between $x = 0$ and $x = 1$

(2)

(*b*) Show that the equation $x^3 + 7x - 5 = 0$ can be arranged to give $x = \dfrac{5}{x^2 + 7}$

(2)

(*c*) Starting with $x_0 = 1$, use the iteration formula $x_{n+1} = \dfrac{5}{x_n^2 + 7}$ three times to find an estimate for the solution of $x^3 + 7x - 5 =$

.....

(3)

(*d*) By substituting your answer to part (*c*) into $x^3 + 7x - 5$, comment on the accuracy of your estimate for the solution to $x^3 + 7x - 5 = 0$

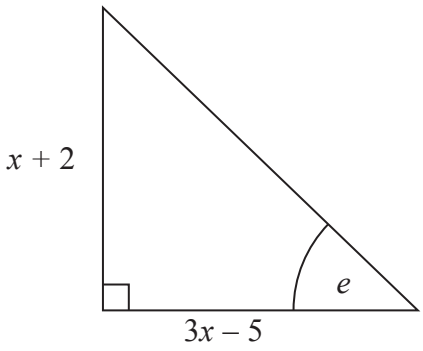
.....

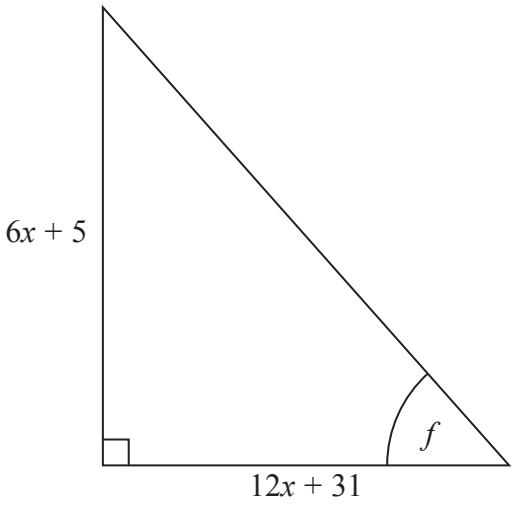
.....

(2)

(Total for Question 2 is 9 marks)

3 Here are two right-angled triangles.





Given that

$$\tan e = \tan f$$

find the value of x.

You must show all your working.

.....

(Total for Question 3 is 6 marks)

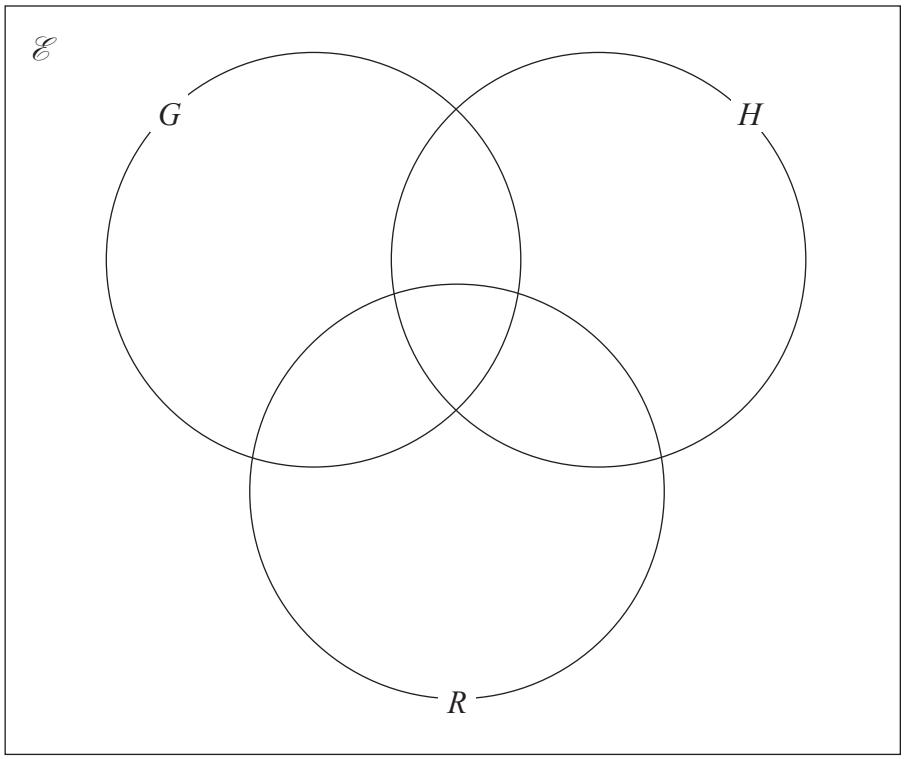
4 All the students in Year 11 at a school must study at least one of Geography (G), History (H) and Religious Studies (R).

In Year 11 there are 65 students.

Of these students

15 study Geography, History and Religious Studies
21 study Geography and History
16 study Geography and Religious Studies
30 study Geography
18 study only Religious Studies
37 study Religious Studies

(a) Using this information, complete the Venn diagram to show the number of students in each region of the Venn diagram.



(3)

A student in Year 11 who studies both History and Religious Studies is chosen at random.

(b) Work out the probability that this student does **not** study Geography.

(2)

(Total for Question 4 is 5 marks)

5

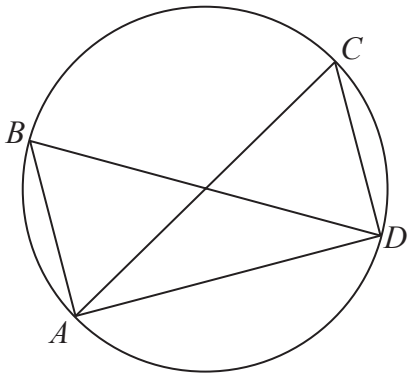


Diagram **NOT** accurately drawn

A *C* and *B* *D* are diameters of a circle, centre .

Prove that triangle *ABD* and triangle *DCA* are congruent.

(Total for Question 5 is 3 marks)

6 The diagram shows cuboid *ABCD GH*.

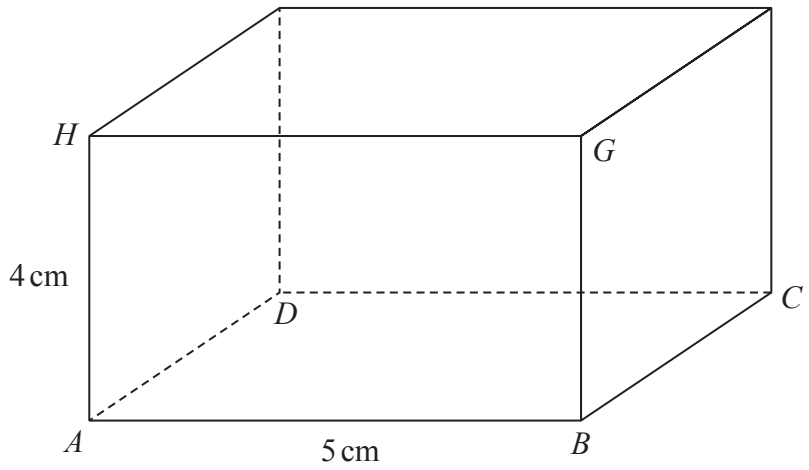


Diagram **NOT** accurately drawn

AB = 5 cm
AH = 4 cm
The size of the angle between *CH* and the plane *ABCD* is 35°

alculate the volume of the cuboid.
Give your answer correct to 3 significant figures.

..... cm^3

(Total for Question 6 is 5 marks)

7 (a) Simplify fully $\left(16x^8y^6\right)^{\frac{1}{2}}$

(2)

(b) Solve $\frac{8-2x}{3}-\frac{2x-3}{2}=4$

Show clear algebraic working.

$x =$

(3)

(c) ake f the sub ect of $m=\sqrt{\frac{1}{3}ef}$

(2)

(Total for Question 7 is 7 marks)

8 The profit made by a shop increases each year.

The profit made by the shop in year n is £P_n

Given that the profit made by the shop in the next year is £P_{n+1} then

$$P_{n+1} = aP_n + 1600 \text{ where } a \text{ is a constant.}$$

The table shows the profit made by the shop in 2018 and in 2019

Year	2018	2019
Profit	£24 000	£26 800

Work out the profit predicted to be made by the shop in 2021

£.....

(Total for Question 8 is 4 marks)

9 Ray has nine cards numbered 1 to 9

1	2	3	4	5	6	7	8	9

Ray takes at random three of these cards.

He works out the product of the numbers on the three cards and records the result.

Work out the probability that the result is a multiple of 3.

.....

(Total for Question 9 is 4 marks)

10 Solve the simultaneous equations

$$x^2 - 9y - x = 2y^2 - 12$$
$$x + 2y - 1 = 0$$

Show clear algebraic working.

(..... , ...)

(..... , ...)

(Total for Question 10 is 5 marks)