

Wellington School



Entrance Paper for OYGCSE and Year 10 Mathematics Courses

Time: 1 hour 30 minutes

Calculators may be used.

Non English speakers may use a dictionary.

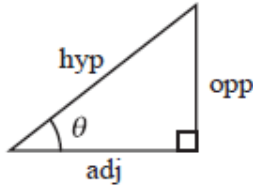
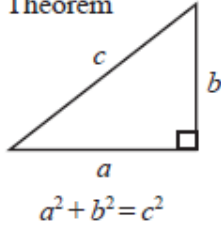
Answer ALL questions.

The total mark for this paper is 60.

You must show sufficient working to make your methods clear. Answers without working may not gain full credit.

Formula Sheet

Pythagoras' Theorem

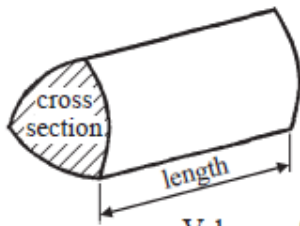


$$\begin{aligned} \text{adj} &= \text{hyp} \times \cos \theta \\ \text{opp} &= \text{hyp} \times \sin \theta \\ \text{opp} &= \text{adj} \times \tan \theta \end{aligned}$$

$$\text{or } \sin \theta = \frac{\text{opp}}{\text{hyp}}$$

$$\cos \theta = \frac{\text{adj}}{\text{hyp}}$$

$$\tan \theta = \frac{\text{opp}}{\text{adj}}$$

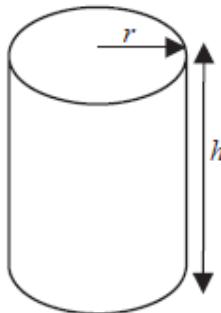


Volume of prism = area of cross section \times length



Circumference of circle = $2\pi r$

Area of circle = πr^2

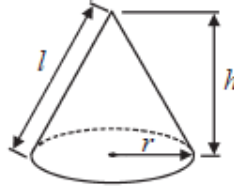


Volume of cylinder = $\pi r^2 h$

Curved surface area of cylinder = $2\pi r h$

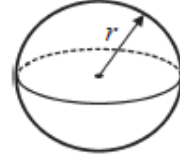
Volume of cone = $\frac{1}{3} \pi r^2 h$

Curved surface area of cone = $\pi r l$

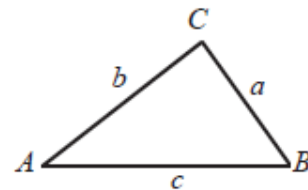


Volume of sphere = $\frac{4}{3} \pi r^3$

Surface area of sphere = $4\pi r^2$



In any triangle ABC

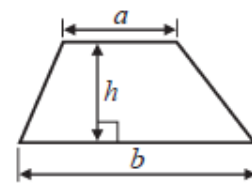


Sine rule: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Cosine rule: $a^2 = b^2 + c^2 - 2bc \cos A$

Area of triangle = $\frac{1}{2} ab \sin C$

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



The Quadratic Equation

The solutions of $ax^2 + bx + c = 0$, where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$



Entrance Paper for OYGCSE and Yr 10 Maths Courses

Total

/ 60

Name:

Section 1: Number

1. (a) Work out $\frac{4}{5} \div \frac{6}{7}$ Give your answer in its simplest form.

Show your working.

- (b) Work out $3\frac{3}{4} - 1\frac{5}{6}$ Give your answer in its simplest form.

Show your working.

2. (a) Philip and Nikos share some money in the ratio 3:4
Nikos receives £24
Work out how much Philip receives.

(4 marks)

- (b) James and Suki share £40 in the ratio 3:5
Work out how much Suki receives.

(2 marks)

3. In a sale, normal prices were reduced by 35%.
- (a) The normal price of a camera was £180
Work out the sale price of the camera.
- (b) The normal price of a clock was reduced by £84
Work out the normal price of the clock.
- (c) The sale price of a computer was £442
Work out the normal price of the computer.

(5 marks)

4. (a) Write 360000 using standard form.
- (b) Write 2.71×10^{-3} as an ordinary number.
- (c) Calculate $\frac{3.6 \times 10^7}{9 \times 10^3}$ Give your answer in standard form.

(4 marks)

4. Solve these equations:

(a) $3x - 5 = 19$

(b) $2(y + 7) = 32$

(c) $7z - 2 = 3z + 11$

(d) $5(w - 1) = 2(w + 4)$

(4 marks)

5. Make x the subject of the formula

$$h = \sqrt{3x + k}$$

(2 marks)

6. Solve $4x - y = 14$

$$3x + 2y = 5$$

(2 marks)

7. Solve the equation $\frac{x}{x-2} - \frac{2}{x+1} = 3$

(2 marks)

8. Solve
$$\begin{aligned} xy + 2x^2 &= 5 \\ x + 2y &= 1 \end{aligned}$$

(2 marks)

Section 3: Geometry

1.

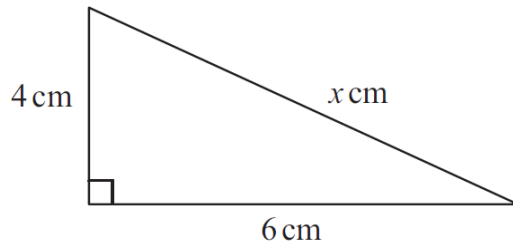


Diagram **NOT**
accurately drawn

Calculate the value of x .
Give your answer correct to 3 significant figures.

(2 marks)

2.

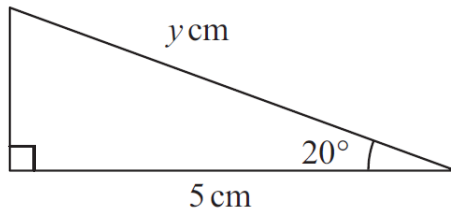


Diagram **NOT**
accurately drawn

Calculate the value of y .
Give your answer correct to 3 significant figures.

(3 marks)

3. The diagram shows a regular octagon, with centre O .

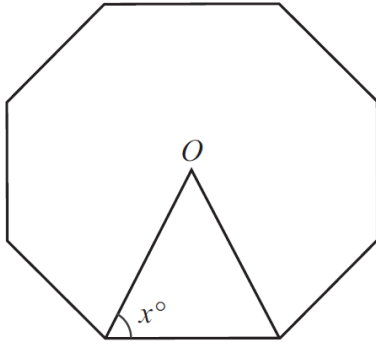


Diagram **NOT**
accurately drawn

Work out the value of x .

(2 marks)

- 4.

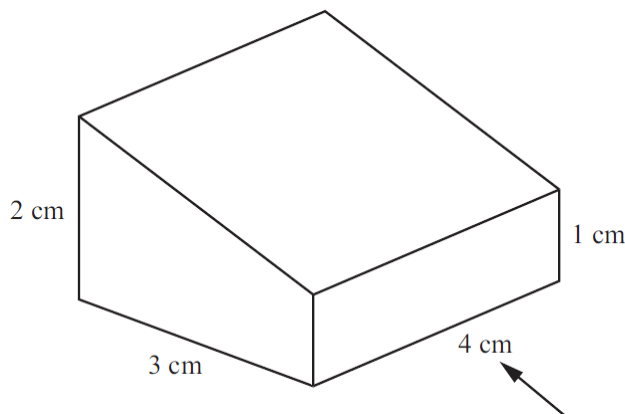
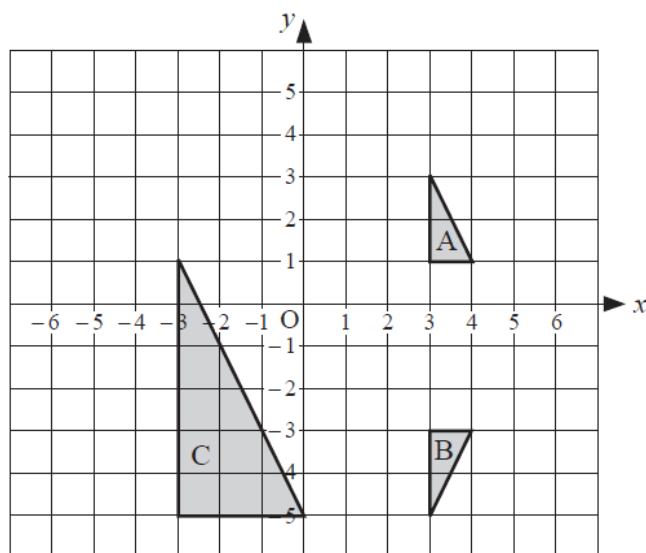


Diagram **NOT**
accurately drawn

Calculate the volume of this prism.
State your units.

(3 marks)

5. Triangles A , B and C are shown on the grid.



- (a) Describe fully the **single** transformation that maps triangle A onto triangle B .
- (b) Describe fully the **single** transformation that maps triangle A onto triangle C .

(2 marks)

6.

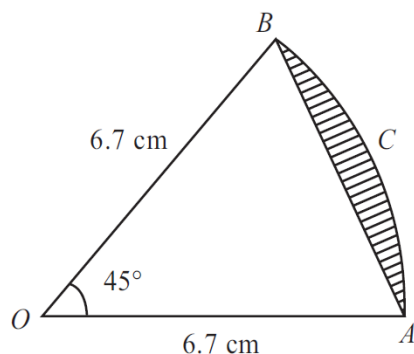


Diagram **NOT**
accurately drawn

AB is a chord of a circle, centre O .
 ACB is an arc of the circle.

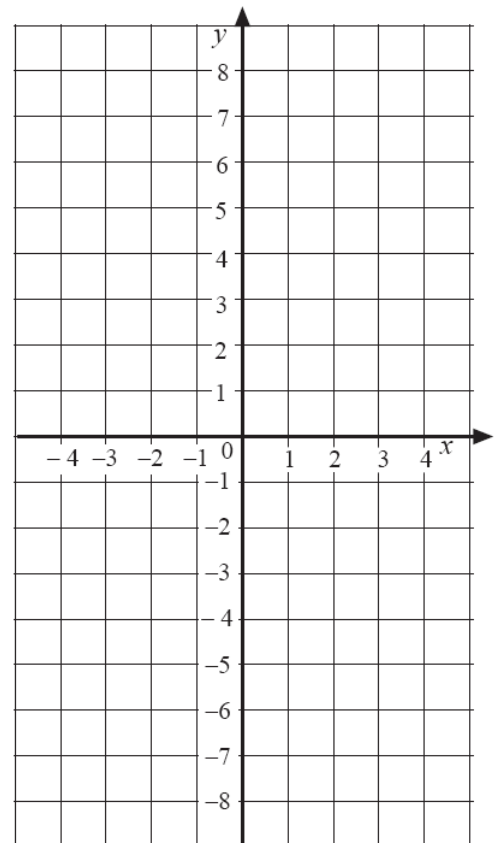
$OA = OB = 6.7$ cm.
Angle $AOB = 45^\circ$.

Calculate the area of the shaded segment.
Give your answer correct to 3 significant figures.

(3 marks)

Section 4: Graphs and Data Handling

1. On the grid draw the line $y = 2x - 3$



(2 marks)

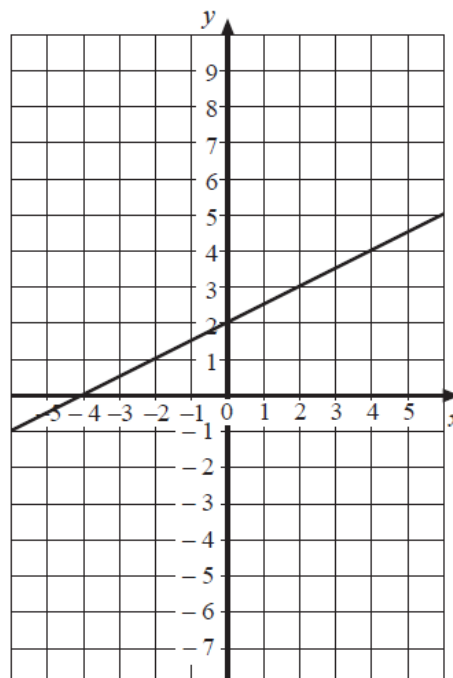
2. In a survey of 36 families, the number of people in each family was recorded. The table shows the results.

Number of people in the family	Frequency
1	3
2	2
3	7
4	13
5	11

Work out the mean number of people in these 36 families.

(2 marks)

3. Write down the equation of this line.



(2 marks)

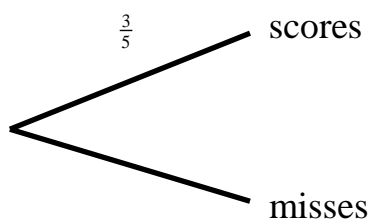
4. The probability that Sam scores a penalty is $\frac{3}{5}$.

In a match, Sam takes two penalties.

- (a) Complete the tree diagram showing the possible outcomes and their probabilities.

1st Penalty

2nd Penalty



- (b) Calculate the probability that Sam scores both of the penalties.

(4 marks)