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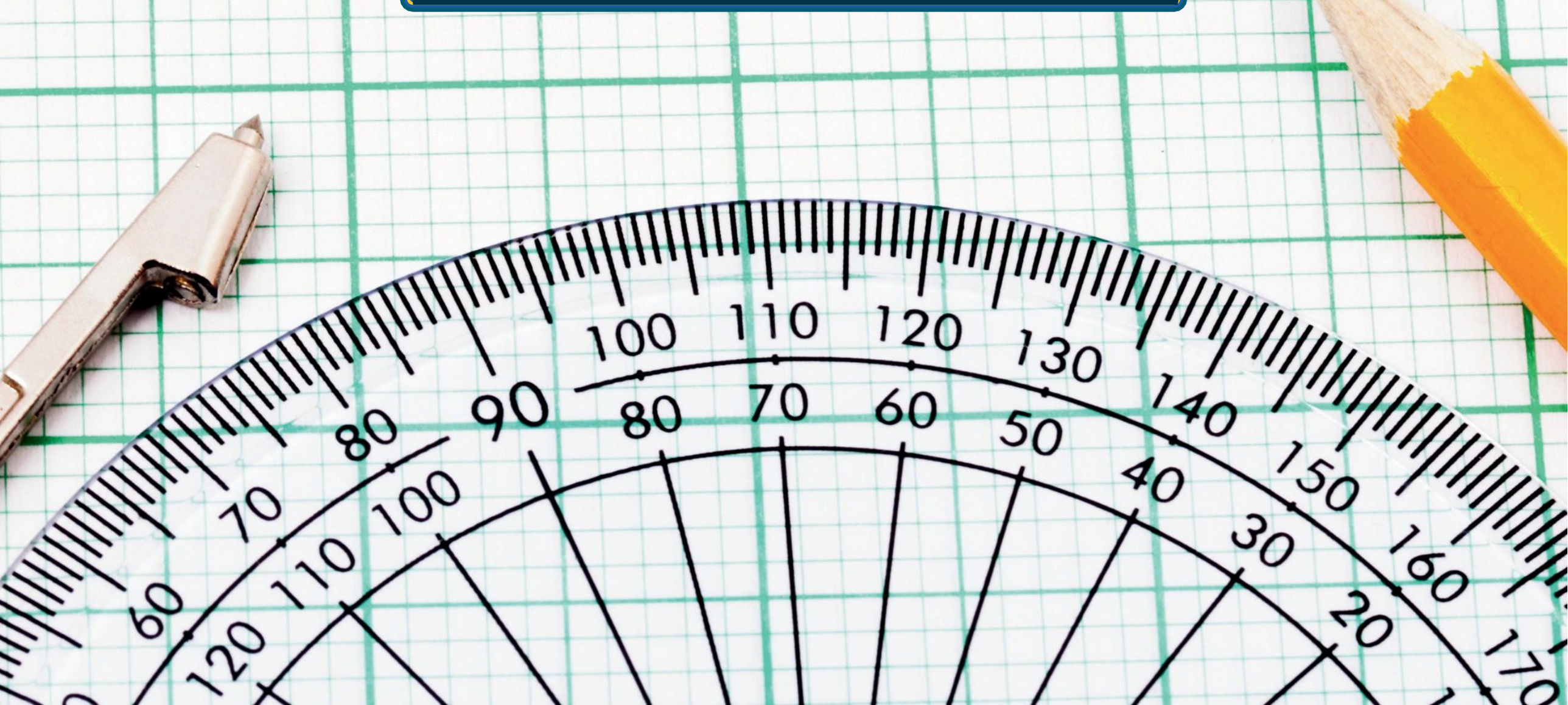
ELEVATE

MATH TOPICAL WORKSHEETS

IGCSE-Int. Mathematics (0607)

Full Portion Mock Test



TEST-PAPER

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

INTERNATIONAL MATHEMATICS **0607/02**

Paper 2 Non-calculator (Extended)

1 hour 30 minutes

You must answer on the question paper.

You will need: Geometrical instruments

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- Calculators must **not** be used in this paper.
- You may use tracing paper.
- You must show all necessary working clearly. You will be given marks for correct methods even if your answer is incorrect.

INFORMATION

- The total mark for this paper is 75.
- The number of marks for each question or part question is shown in brackets [ ].

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[Turn over

1. Evaluate $\frac{6\times10^9+1.8\times10^8}{3\times10^2}$

Give your answer in standard form.

[2]

2. A college offers courses in Astronomy (A), Biology (B), Chemistry (C) and Physics (D) A group of 220 students are asked which of these courses they study.
Here is some information about the numbers of students who study these subjects.

$$\mathrm{n}(A) = 58 \mathrm{n}(B \cap C \cap D) = x \mathrm{n}(B \cap D) = 48$$
$$\mathrm{n}(B \cap C \cap D') = 35 \mathrm{n}([B \cup C]' \cap D) = 20$$

The incomplete Venn diagram on the opposite page shows some other information about the numbers of students who study these subjects.
(a) Using all the information given, complete the Venn diagram giving the number of elements in each appropriate subset, in terms of x where necessary.

[3]

Given that $\mathrm{n}(C') = 105$

(b) find the value of x

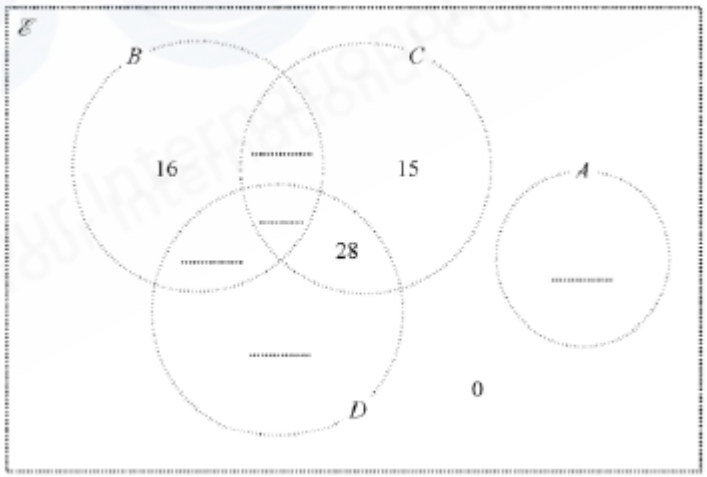
[2]

One of the 220 students is chosen at random.

(c) Write down the probability that this student studies Biology only.

[1]

(d) Write down the probability that this student studies Chemistry but not Biology.



[1]

3.

$$\frac{35 \times (\sqrt[3]{25})^{6(2a-3)}}{7 \times 25^{2a+1}} = 5^{w}$$

Find an expression for w in terms of a

Give your answer in the form $na + m$ where n and m are integers.

[4]

4. Solve the simultaneous equations

$$x - y = 5$$
$$2x^2 + y^2 + 2xy = 85$$

Show clear algebraic working.

[The solutions of $ax^2 + bx + c = 0$ where $a \neq 0$ are given by $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$]

[6]

5. (a) Solve the inequality $4x + 3 \leqslant 31$

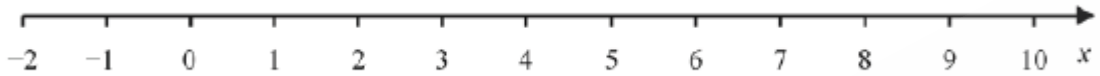
[2]

(b) Solve the inequality $1 < 2x + 3 < 21$

[2]

(c) Hence represent on the number line opposite, the set of values of x for which

$$4x + 3 \leqslant 31 \text{ and } 1 < 2x + 3 < 21$$



[2]

6. f and g are two functions such that

$$\text{f: } x \mapsto x^2 + 2x \text{ where } x > -1$$
$$\text{g: } x \mapsto \frac{13}{x+2}$$

(a) State the value of x that must be excluded from any domain of g

[1]

(b) Find $f(3)$

[1]

(c) Find the value of x for which $g(x) = 5$

[2]

(d) Find $\mathrm{fg}(24)$

[2]

(e) Find the value of x for which $\mathrm{gf}(x) = 4$ show your working clearly.

[4]

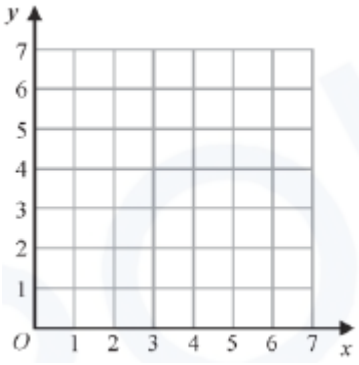
The function h is such that $\mathrm{h}: x \mapsto 5x^2 - 10x - 4$ where $x \geqslant 1$

(f) Find the inverse of $\mathrm{h}(x)$ in the form $\mathrm{h}^{-1}: x \mapsto \cdots$

[The solutions of $ax^2 + bx + c = 0$ where $a \neq 0$ are given by $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$]

[4]

7.



(a) On the grid, draw and label the straight line with equation

(i) $y = 2$

(ii) $x + y = 5$

(iii) $y = 2x + 1$

[3]

(b) On the grid, show by shading, the region defined by the inequalities

$$y \geqslant 2 \text{ and } x + y \leqslant 5 \text{ and } y \leqslant 2x + 1$$

Label the region **R**.

[1]

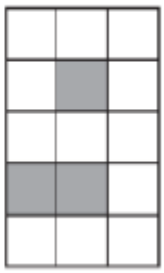
8. A pattern is made with white squares and shaded squares.

(a)

Shade one more square to make a pattern with exactly 1 line of symmetry.

[1]

(b)



Shade one more square to make a pattern with rotational symmetry of order 2

[1]

9.

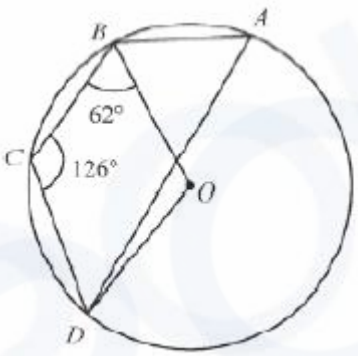


Diagram NOT accurately drawn

In the diagram, A, B, C and D are points on a circle, centre O. $\angle CBO = 62°$ and $\angle BCD = 126°$

(a) Find the size, in degrees, of $\angle BAD$.

Give a reason for your answer.

$\angle BAD = \cdots$ ……………………………….. [2]

(b) Find the size, in degrees, of $\angle ODC$.

Give reasons for your working.

$\angle ODC = \cdots$ …………………………….. ^{0}[4]

10.

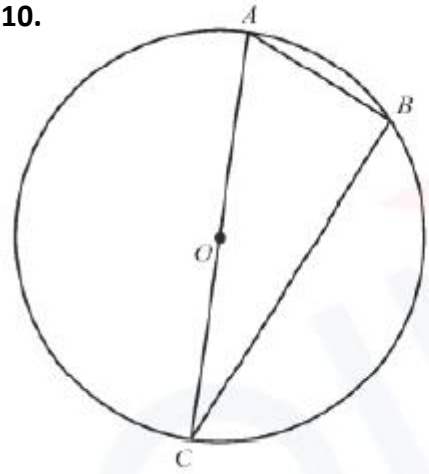


Diagram **NOT** accurately drawn

Figure 1 shows three points A, B and C on a circle with centre O where AOC is a diameter of the circle.

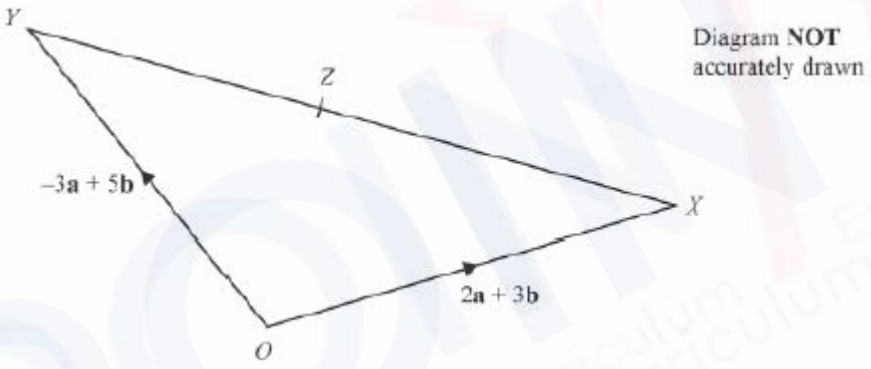
The length of AB is 2 cm less than the length of BC

Given that $AC \leqslant \frac{5}{4}BC$

calculate the range of possible values for the length, in cm to one decimal place, of BC

[7]

11.



The diagram shows $\triangle OXY$ where $\overrightarrow{OX} - 2\mathbf{a} + 3\mathbf{b}$ and $\overrightarrow{OY} - 3\mathbf{a} + 5\mathbf{b}$

(a) Find and simplify an expression, in terms of $\mathbf{a}$ and $\mathbf{b}$, for $\overrightarrow{YX}$.

[2]

The point Z on YX is such that $\overrightarrow{OZ} = -\frac{2}{9}\mathbf{a} + \frac{35}{9}\mathbf{b}$

(b) Calculate, in its simplest form, the ratio of $YZ : ZX$

[3]

12. The six numbers

$$x \quad y \quad y \quad 12 \quad (x+y) \quad 12$$

are in ascending order of size.
The mode of the six numbers is 12 and the mean of the six numbers is 9.5
(a) Find the value of x and the value of y.

[5]

(b) Hence find the median of the six numbers.

[2]

13. To pass a course, Preety has to pass two tests, test A and test B.

Each test only has to be passed once.
Passing test **A** and passing test **B** are independent events.
Preety has three attempts to pass test **A**.
The probability that she passes test **A** on her first attempt is $\frac{3}{5}$
If she fails on her first attempt, the probability that she passes on her second attempt is $\frac{2}{5}$
If she fails on her second attempt, the probability that she passes on her third attempt is $\frac{3}{8}$
(a) Calculate the probability she passes test **A**.

[3]

Preety decides to take the two tests only if the probability that she passes the course is greater than 0.5

(b) State whether or not Preety should take the two tests. Give a reason for your answer.

[2]