



SEKOLAH BUKIT SION

IGCSE Mock Examination 2021

STUDENT
NAME

EXAM
NUMBER

CLASS

0580 MATHEMATICS (PAPER 4)

Year 10/Year 11

12 April 2021

2 hours

Additional Materials:

- Scientific Calculator
- Ruler
- Graphing Paper

READ THESE INSTRUCTIONS FIRST

Write your name, exam number and grade on all the work you hand in.

Write in dark blue or black pen.

Use an HB pencil for any diagrams or graphs.

Do not use staples, paper clips, glue or correction fluid.

Answer **all** questions.

At the end of the examination, fasten all your work securely together.

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

The total of the marks for this paper is 100.

Score :

QUESTION 01

The fares for a train journey are shown in the table below.

From London to Marseille	Standard fare	Premier fare
Adult	\$84	\$140
Child	\$60	\$96

(a) For the **standard fare**, write the ratio **adult fare: child fare** in its simplest form.

Answer: [1]

(b) For an **adult**, find the percentage increase in the cost of the standard fare to the premier fare.

Answer: [3]

(c) For one journey from London to Marseille, the ratio

$$\text{number of adults : number of children} = 11 : 2.$$

There were 220 adults in total on this journey.
All of the children and 70% of the adults paid the standard fare.
The remaining adults paid the remaining fare.

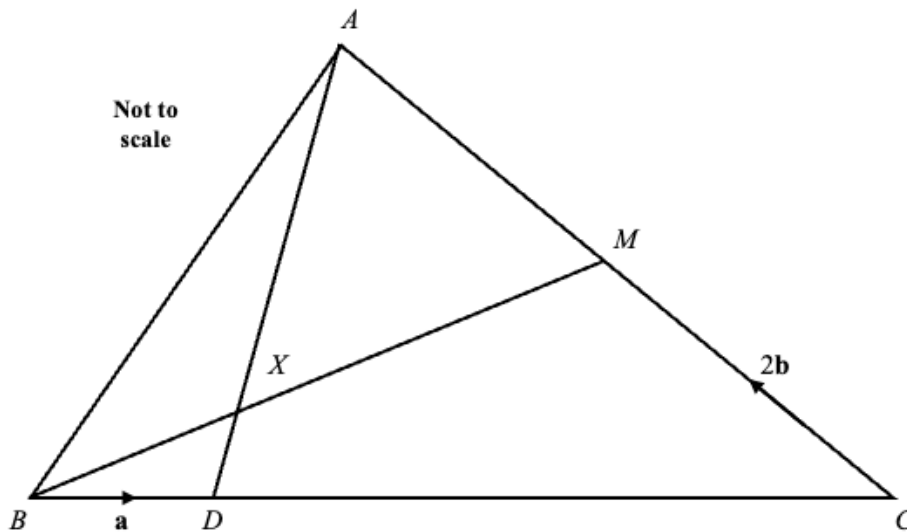
Calculate the total of the fares collected from all the adults and children.

Answer: [4]

(d) The child's standard fare of \$60 is 20% more than the child's standard fare last year.
Calculate the child's standard fare last year.

Answer: [2]

QUESTION 02



In the diagram, $BC = 4BD$ and $DA = 5DX$. M is the midpoint of AC . $\overrightarrow{BD} = \mathbf{a}$ and $\overrightarrow{CM} = 2\mathbf{b}$.

(a) Express, as simple as possible, in terms \mathbf{a} and/or \mathbf{b} ,

(i) \overrightarrow{DC}

Answer: [1]

(ii) \overrightarrow{DA} ,

Answer: [1]

(iii) \overrightarrow{DX} ,

Answer: [1]

(b) Show that $\overrightarrow{BX} = \frac{4}{5} (2\mathbf{a} + \mathbf{b})$.

[2]

(c) Express \overline{BM} as simply as possible, in terms of **a** and **b**.

Answer: [1]

(d) Find

(i) $\frac{BX}{BM}$,

Answer: [1]

(ii) $\frac{\text{area of } \triangle ABX}{\text{area of } \triangle AMX}$,

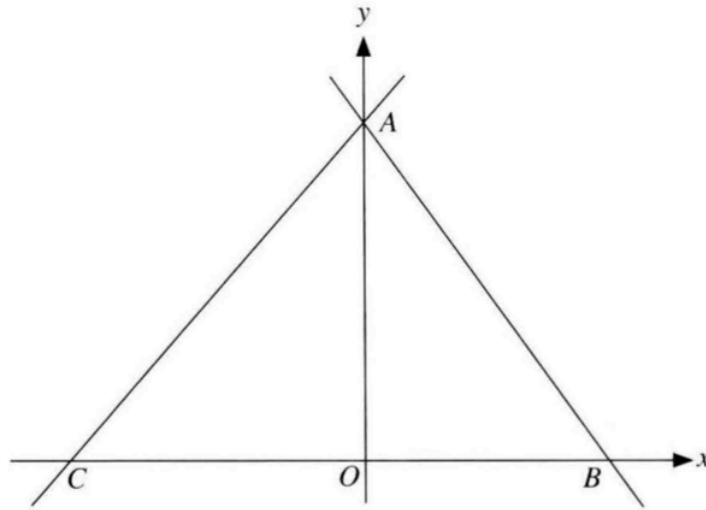
Answer: [1]

(iii) $\frac{\text{area of } \triangle ABX}{\text{area of } \triangle ABC}$

Answer: [2]

QUESTION 03

In the diagram, B is the $(4, 0)$ and the equation of AC is $7y = 8x + 56$.
Find the



(a) coordinates of A and of C ,

Answer: [1]

..... [1]

(b) equation of line AB ,

Answer: [2]

(c) area of triangle ABC

Answer: [1]

(d) coordinates of D such that $ABCD$ is a parallelogram.

Answer: [2]

QUESTION 04

The table below shows the time, in seconds, taken by each of 120 boys to solve a puzzle.

Time (t seconds)	$20 < t \leq 30$	$30 < t \leq 35$	$35 < t \leq 40$	$40 < t \leq 60$	$60 < t \leq 100$
Frequency	38	27	21	16	18

(a) Write down the modal class and the median class.

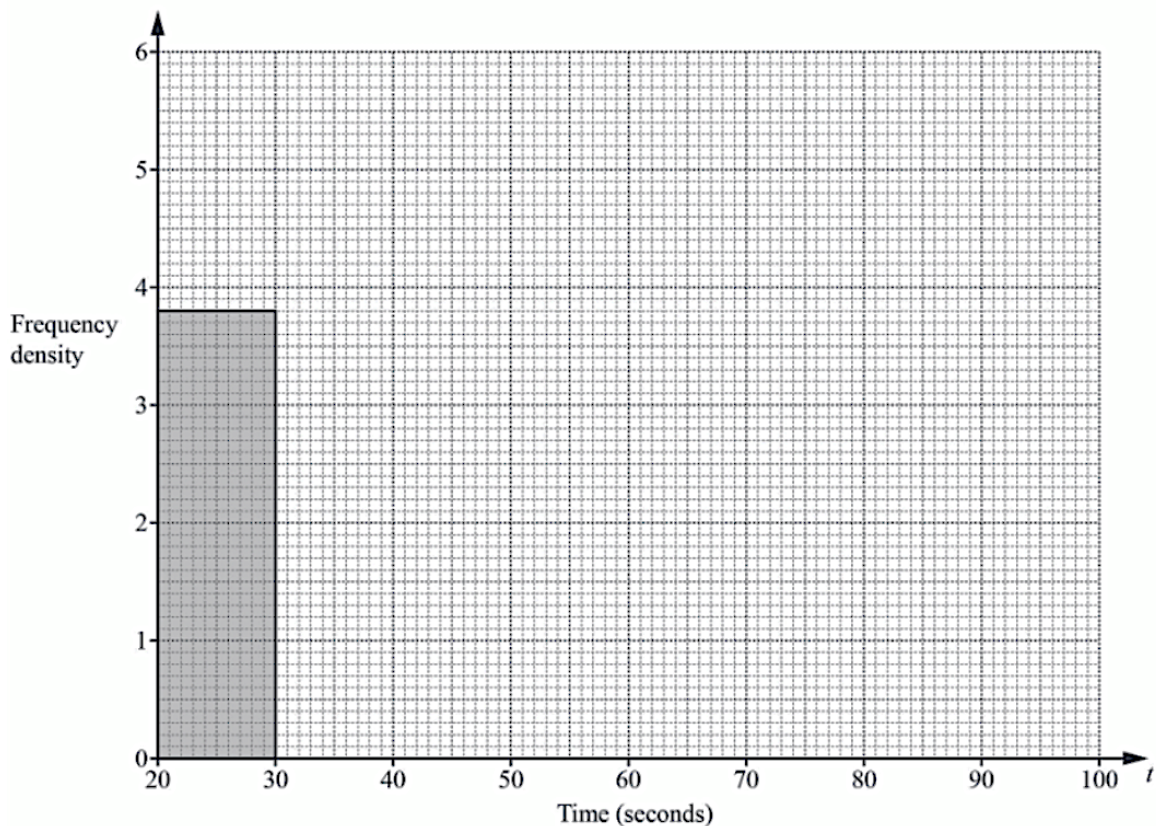
Answer: Modal class: [1]

Median class: [1]

(b) Calculate an estimate of the mean.

Answer: [3]

(c) On the grid, complete the histogram to show the information in the frequency table. [4]



QUESTION 05

Angelo has a bag containing 3 white counters and x black counters.
He takes two counters at random from the bag, **without replacement**.

(a) Complete the following statement.

The probability that Angelo takes two black counters is

$$\frac{x}{x+3} \times \underline{\hspace{2cm}} . \quad [2]$$

(b) The probability that Angelo takes two black counters is $\frac{7}{15}$.

(i) Show that $4x^2 - 25x - 21 = 0$. [4]

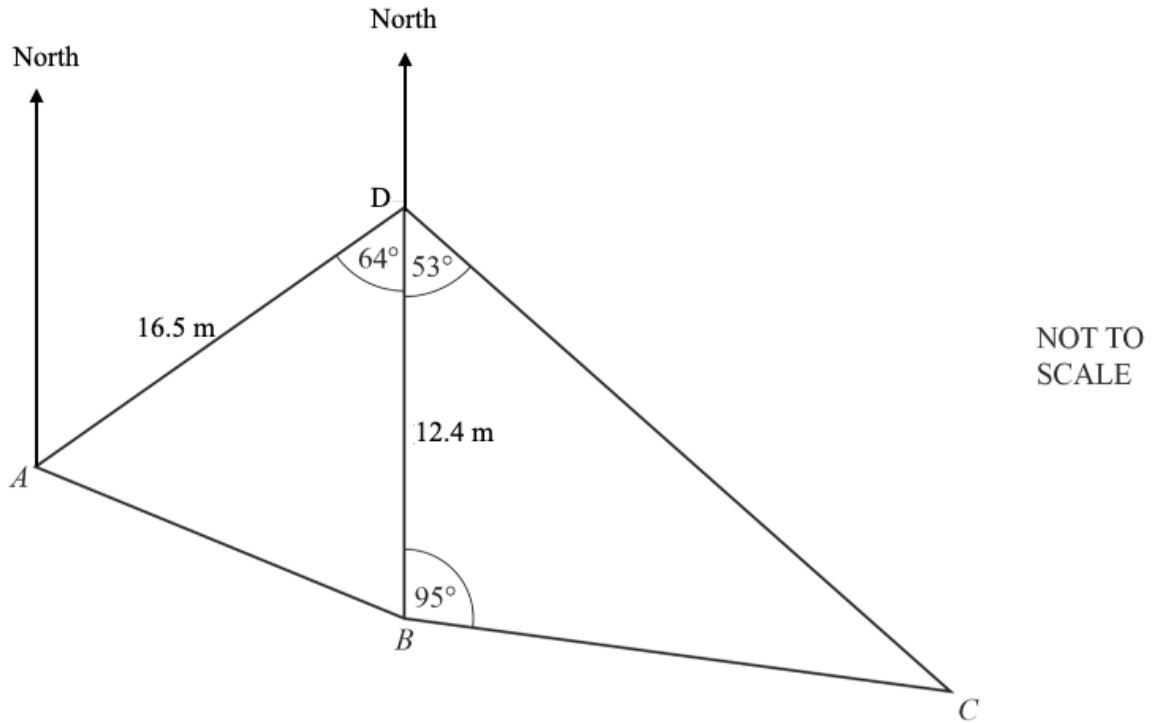
(ii) Solve by factorization $4x^2 - 25x - 21 = 0$.

Answer: [3]

(c) Write down the number of black counters in the bag.

Answer: [1]

QUESTION 06



Four posts A , B , C and D mark the boundaries of Martha's garden as shown in the diagram above.

Post D is 16.5 metres away from A .

Post B is 12.4 metres south of D .

C has a bearing of 95° from B .

(a) Write down the bearing of D from A .

Answer: [1]

(b) Write down the bearing of C from D .

Answer: [1]

(c) Find AB .

Answer: [4]

(d) Calculate the measure of angle DAB .

Hence, show that the bearing of B from A is 109° , to the nearest degree.

[4]

(e) If $BC = 18.9$ m, show that the **total area** of Martha's garden is 209 sq. m², correct to 3sf.

[3]

QUESTION 08

- (a) A map is drawn to a scale of 1 cm to 250 m.
An airport has an area of 240 cm^2 on the map. Find its actual area in km^2 .

Answer: [2]

- (b) Two similar containers have capacities of 24 cm^3 and 375 cm^3 respectively.
Write down the ratio of their:

(i) heights,

Answer: [2]

(ii) surface areas.

Answer: [2]

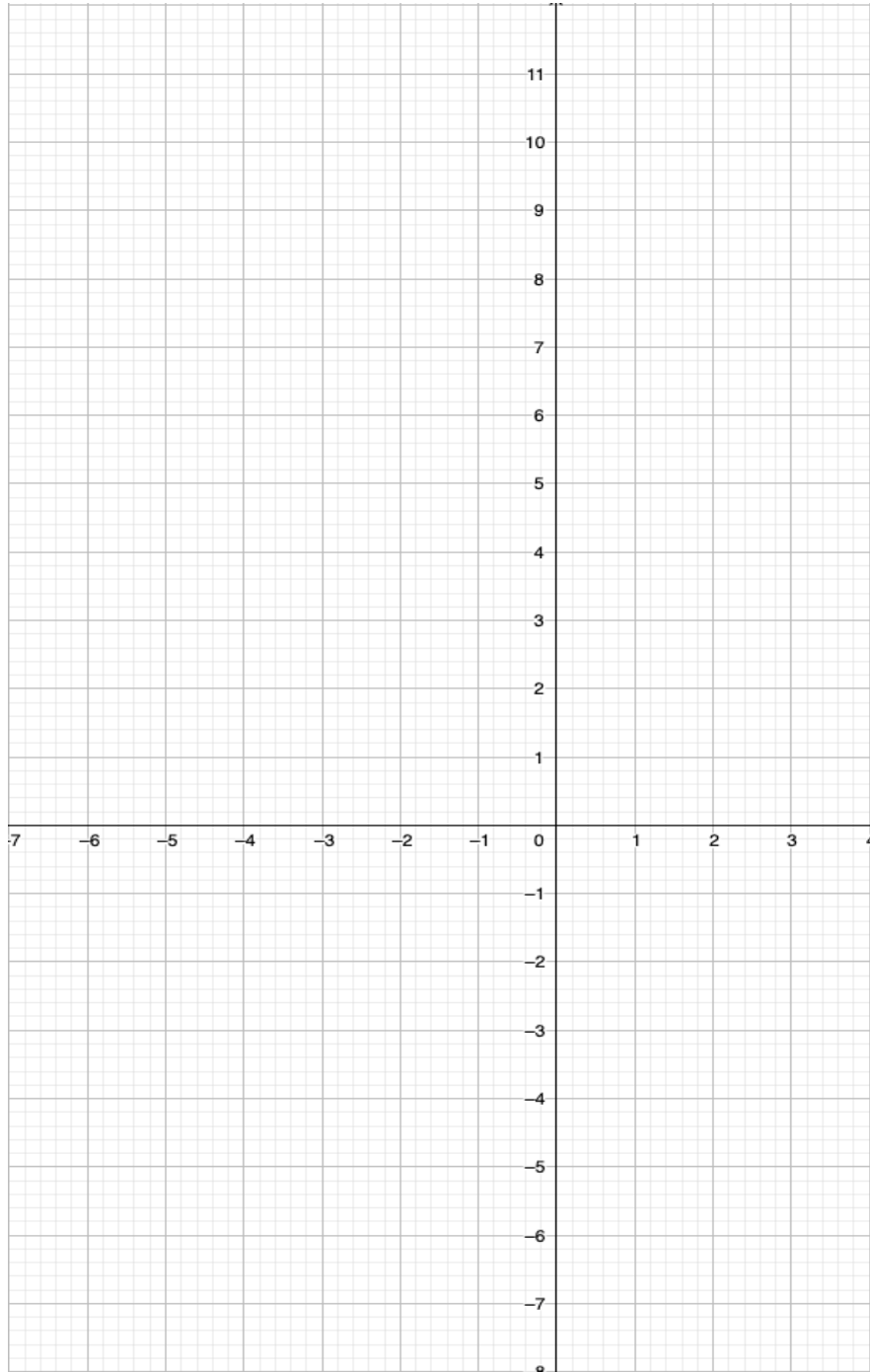
QUESTION 09

(a) Complete this table of values for $y = 2^x - \frac{2}{x} + 1$.

[3]

x	-6	-5	-4	-3	-2	-1	-0.2	0	0.2	1	2	3
y	1.35		1.6		2.25	3.5				1	4	

(b) On the grid, draw the graph of $y = 2^x - \frac{2}{x} + 1$ for $-6 \leq x \leq 3$, using 2cm \rightarrow 2 units on both axes. [4]



(c) Use your graph to solve $2^x - \frac{2}{x} + 1 = 3$.

Answer: [1]

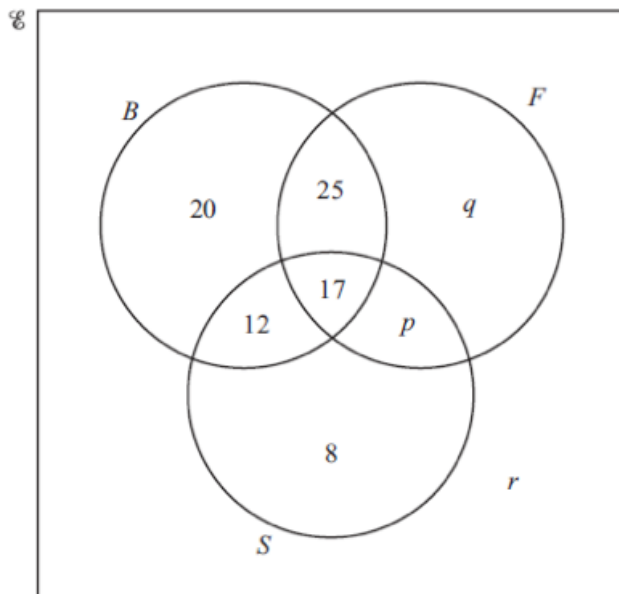
(d) Write down the equation of the straight line that must be used to be drawn on the given curve to solve $2^x - \frac{2}{x} - 3 = \frac{1}{2}x$. (*Line need not be drawn.*)

Answer: [2]

(e) **By drawing a suitable line on your graph**, find the gradient of the curve at $x = -3$.

Answer: [3]

QUESTION 10



In a survey, 100 students are asked if they like basketball (B), football (F) and swimming (S). The Venn diagram shows the results.

42 students like swimming.
40 students like one sport.

(a) Find the values of p , q and r .

Answer: [3]

(b) How many students like basketball and swimming but not football?

Answer: [1]

(c) Find $n((B \cup S) \cap F')$

Answer: [1]

(d) **Two students are chosen** at random from those who like basketball. Find the probability that they each like exactly one other sport.

Answer: [2]

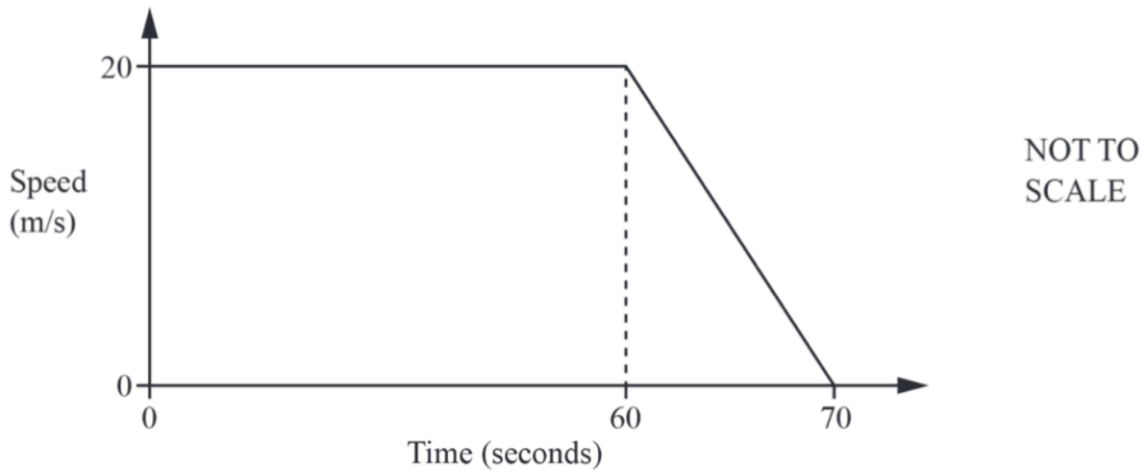
QUESTION 11

A sphere with radius x cm has a volume of 1000 cm^3 .
Calculate the value of x .

[The volume, V , of a sphere with radius r is $V = \frac{4}{3}\pi r^3$.]

Answer: [3]

QUESTION 12



The diagram shows information about the final 70 seconds of a car journey.

(a) Find the deceleration of the car.

Answer: [1]

(b) Find the distance travelled by the car during the 70 seconds.

Answer: [3]

- END OF EXAMINATION -