# SEKOLAH BUKIT SION
## IGCSE Mock Examination 2021

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**EXAM NUMBER**

**CENTRE ID NO.**

## 0580 MATHEMATICS (PAPER 2)
### SET A

**Year 10/Year11**

**06 April 2021**

**1 hour 30 minutes**

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.
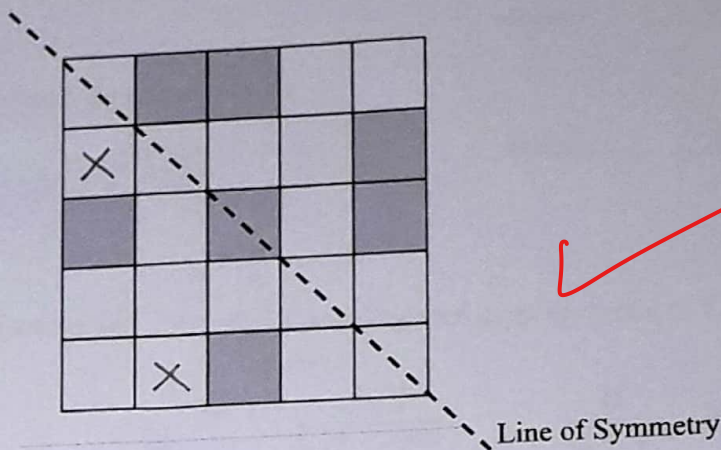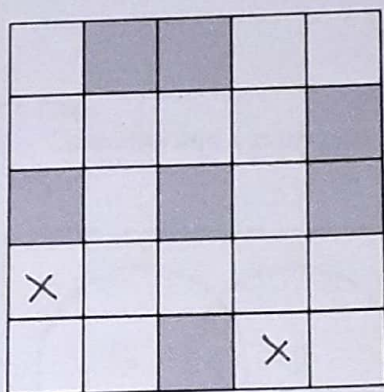The total of the marks for this paper is 70.

Score : 70/70    100

This document consists of **11** printed pages including this page.

**1**  (a) Mark two more squares with "X" so that this grid has **line of symmetry** as drawn. [1]



Line of Symmetry

(b) Mark two more squares with "X" so that this grid has **rotational symmetry of order 4**. [1]



**2**  8   3   5   8   7   8

From the list of numbers, write down

(a) the mode,

Answer: ........... 8 ........... [1]

(b) the median,

3  5  7  8  8  8     $\dfrac{7+8}{2} = 7.5$     Answer: ........... 7.5 ........... [1]

(c) the mean.

Answer: ........... 6.5 ........... [1]

2

3    Estimate the following as specified.

   (a)   0.047883 correct to 2 significant figures

   Answer: ...........0.048........ ✓....... [1]

   (b)   1096 correct to 3 significant figures

   Answer: ......1.10 × 10³....... ✓.. [1]
            1100

4    **Without using a calculator**, estimate, by rounding each number correct to 1 significant figure,

$$10.2 \quad \frac{\sqrt{104.3}}{8.72 - 7.389} \qquad \frac{10}{9-7} = 5$$

   **You must show all you working.**

                                    5 ✓
   Answer: ............................. [2]

5    There are 30 students in a class.
     20 study Physics, 15 study Chemistry and 3 study neither Physics nor Chemistry.
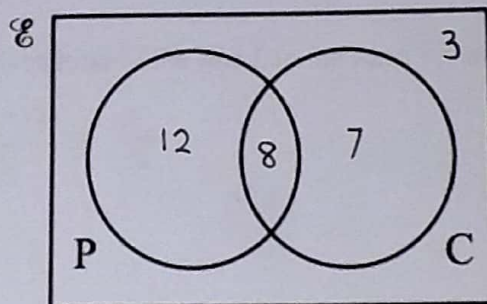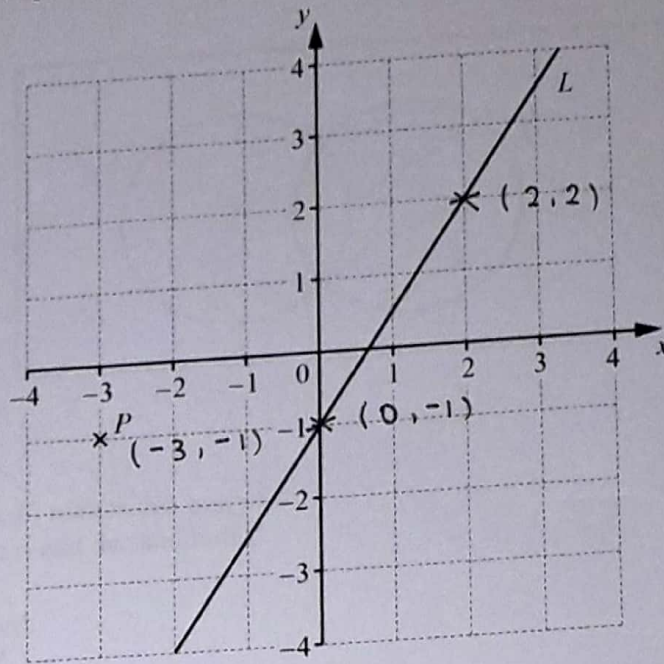


     What is the probability that a student chosen at random studies both Chemistry and Physics?

$$\frac{8}{30}$$

                                    $\frac{4}{15}$
   Answer: ............................. [2]

3

6    The diagram shows a point $P$ and a line $L$.



(a) Write down the coordinates of point $P$.

Answer: ..... $(-3, -1)$ ..... [1]

(b) Write down the equation of the line $L$ in the form $y = mx + c$.

$$m = \frac{2 - (-1)}{2 - 0} = \frac{3}{2}$$

Answer: ..... $y = \frac{3}{2}x - 1$ ..... [2]

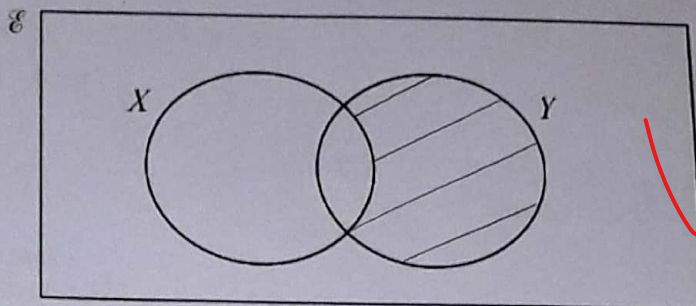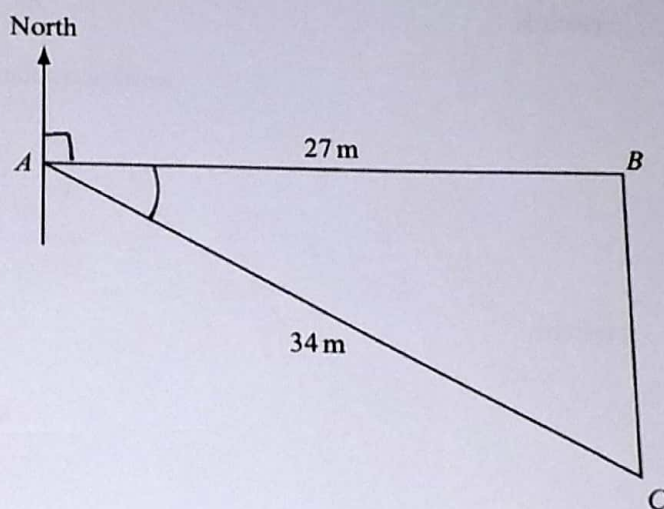7    Write the following numbers in standard form.

(a) 640 000

Answer: ..... $6.4 \times 10^5$ ..... [1]

(b) 0.0061

Answer: ..... $6.1 \times 10^{-3}$ ..... [1]

4

**8**  In the Venn diagram, shade  $X' \cap Y$.

[1]



**9**  In the diagram, $B$ is 27 metres due east of $A$.
$C$ is 34 metres from $A$ and due south of $B$.



NOT TO
SCALE

**(a)** Using trigonometry, calculate angle $BAC$.

$$\cos^{-1}\left(\frac{27}{34}\right) = 37.4$$

Answer: ..........$37.4°$.......... [2]

**(b)** Write down the bearing of $C$ from $A$.

$$37.4 + 90 = 127.4$$

Answer: ..........$127.4°$.......... [1]

5

**10** Expand and simplify.
$(x + 1)(x + 2) + 2x(x - 3)$

$(x^2 + 2x + x + 2) + 2x^2 - 6x$

$x^2 + 3x + 2 + 2x^2 - 6x$

$3x^2 - 3x + 2$

Answer: $3x^2 - 3x + 2$ .......... [3]

**11** A flag cost $15 to make.
Soraya sells one flag for $21.

Calculate the percentage profit.

$21 - 15 = \$6$

$profit = \dfrac{6}{15} \times 100 = 40\%$

Answer: $40\%$ .......... [3]

**12** Simplify, with positive indices.

**(a)** $\left(\dfrac{x^3}{8}\right)^{-\frac{4}{3}}$

$\dfrac{x^{-4}}{2^{-4}} = \dfrac{2^4}{x^4} = \dfrac{16}{x^4}$

Answer: $\dfrac{16}{x^4}$ .......... [3]

**(b)** $5m^2 \times 2m^3$

$10 m^5$

Answer: $10 m^5$ .......... [1]

**13** Solve the equation $3(2x - 4) = 4(x + 7)$.

$6x - 12 = 4x + 28$

$2x = 40$

$x = 20$

Answer: $20$ .......... [3]

6

**14** $y$ is directly proportional to $(x-1)^2$.
When $x = 3$, $y = 24$.

Find $y$ when $x = 6$.

$$Y = K(x-1)^2$$
$$24 = K(3-1)^2$$
$$24 = K4$$
$$K = 6$$

$$Y = 6(6-1)^2$$
$$= 6(25)$$
$$= 150$$

Answer: ............... 150 ............... [3]

**15** The amount of fuel, $t$ litres, in a boat's fuel tank is 135 litres, correct to the nearest litre.
Complete the statement about the value of $t$.

upper $= 135 + 0.5 = 135.5 \ell$
lower $= 135 - 0.5 = 134.5 \ell$

Answer: $134.5\ell \le t < 135.5\ell$ [2]

**16** Solve the simultaneous equations.
You must show all your working.

$$5x + 8y = 4$$
$$\frac{1}{2}x + 3y = 7$$

$(x + 6y = 14)\,5 \rightarrow 5x + 30y = 70$

$$5x + 30y = 70$$
$$5x + 8y = 4 \quad -$$
$$\overline{\phantom{xxxxxx}}$$
$$22y = 66$$
$$Y = 3$$

$$5x + 8(3) = 4$$
$$5x + 24 = 4$$
$$5x = -20$$
$$X = -4$$

Answer: $Y = 3$   $X = -4$ ............... [4]

7

**17** The distance between Prague and Vienna is 254 kilometres.
The local time in Prague is the same as the local time in Vienna.
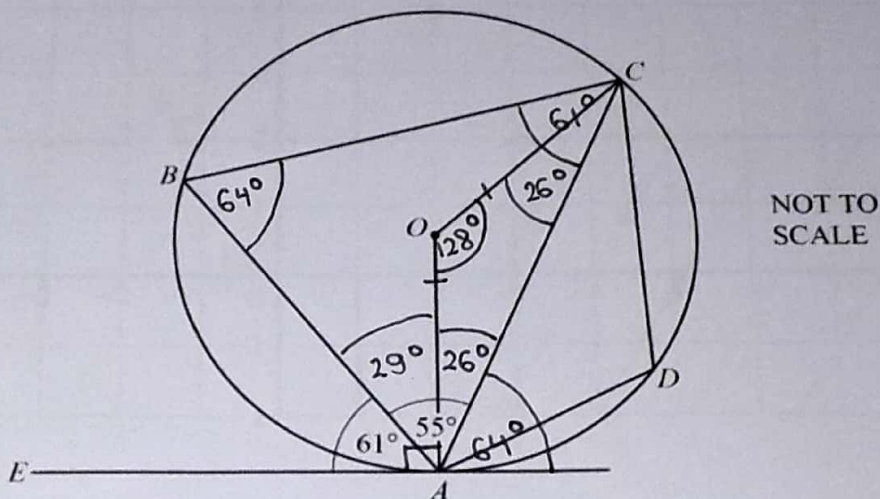A train leaves Prague at 15 20 and arrives in Vienna in 19 50 the same day.

Calculate the average speed of the train, in km/h.

time = 4h 30 min = $4\frac{1}{2}$ h

speed = 254 ÷ $4\frac{1}{2}$ = 56.4 km/h

Answer: ......... 56.4 km/h ......... [2]

**18** In the diagram, $A$, $B$, $C$ and $D$ lie on the circle, centre $O$.
$EA$ is a tangent to the circle at $A$.
Angle $EAB = 61°$ and angle $BAC = 55°$.



NOT TO SCALE

**(a)** Find angle $BAO$.

$(61 + 55) - 90 = 26°$

$55 - 26 = 29°$

Answer: ......... 29° ......... [1]

**(b)** Find angle $AOC$.

$180 - 26 - 26 = 128°$

Answer: ......... 128° ......... [2]

**(c)** Find angle $ABC$.

$180 - 61 - 55 = 64°$

Answer: ......... 64° ......... [1]

**(d)** Find angle $CDA$.

$180 - 64 = 116°$

Answer: ......... 116° ......... [1]

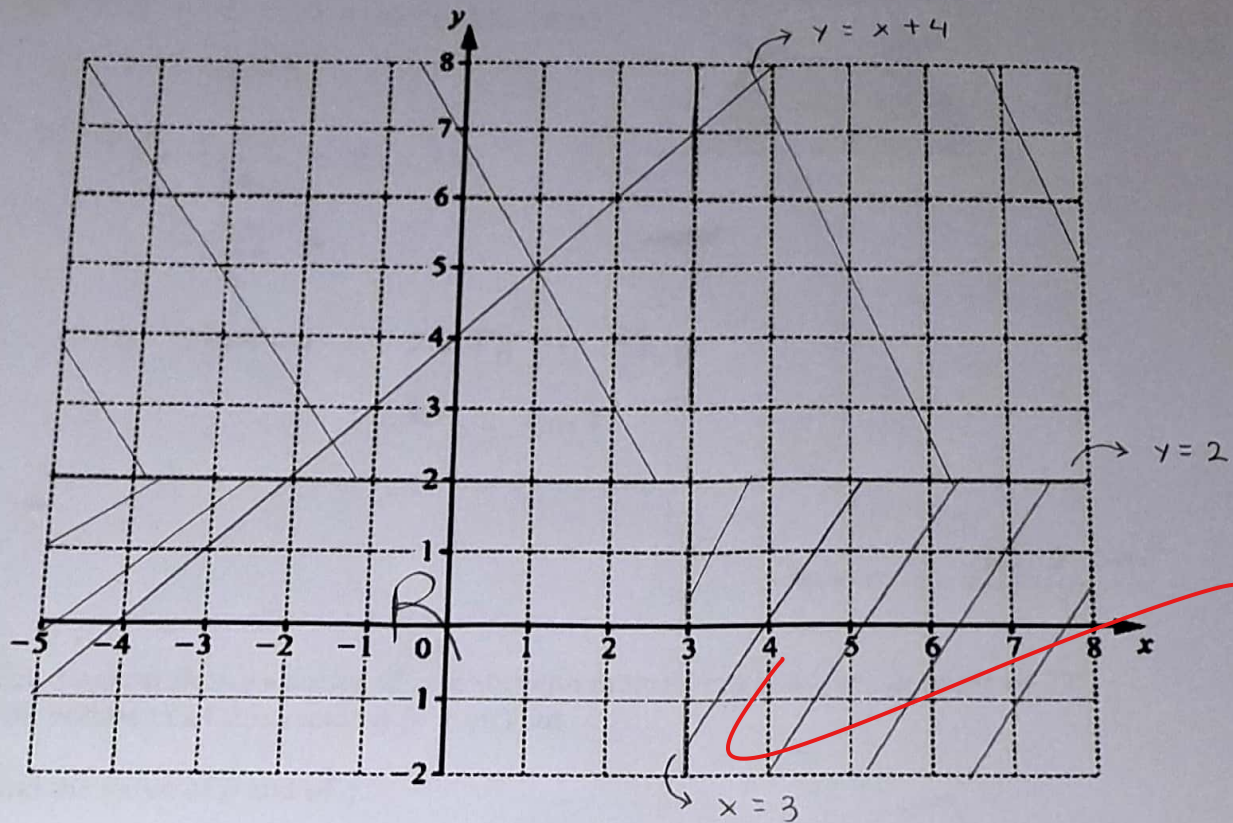8

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**19** By shading the **unwanted** regions of the grid, draw and label clearly the region $R$ which satisfies the following three inequalities.

$y \le 2$         $x < 3$         $y \le x + 4$                                    [5]
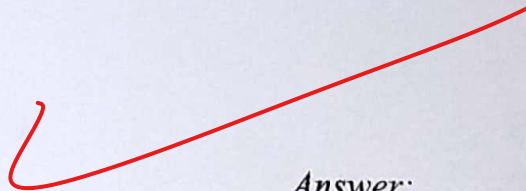


**20**

| 1 | 2 | 3 | 4 | 5 |

The diagram shows five cards with each numbered as 1, 2, 3, 4 and 5.
Jessie draws a card randomly.

Find the probability that the card drawn does not show a prime number.

not prime number = 1, 4

$$\frac{2}{5}$$

Answer: ..............$\frac{2}{5}$.............. [

**21** The diagram shows an equilateral triangle $ABC$ with sides of length 10 cm.
$AMN$ is a sector of a circle, centre $A$.
$M$ is the midpoint of $AC$.

Work out the area of the shaded region.

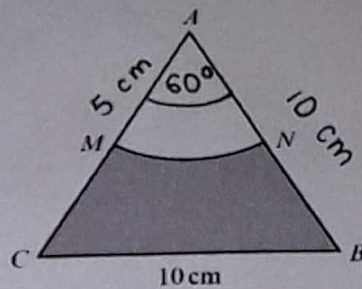area $\triangle = \frac{1}{2} \times 10 \times 10 \times \sin(60)$

$\qquad = 25\sqrt{3}$

area $\triangle = \frac{60}{360} \times \pi \times (5)^2$

$\qquad = \frac{25}{6}\pi$

area shaded $= 25\sqrt{3} - \frac{25}{6}\pi$

$\qquad = 30.2 \text{ cm}^2$
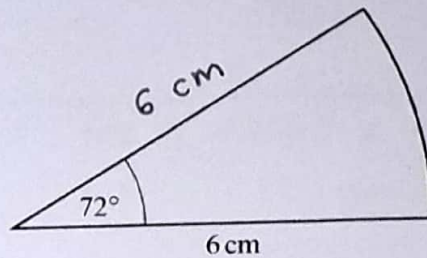
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Answer: ...... $30.2 \text{ cm}^2$ ...... [4]

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**22** The diagram shows a sector of a sector with radius 6 cm and a sector angle of 72°.
The perimeter of this sector is $(p + q\pi)$ cm.
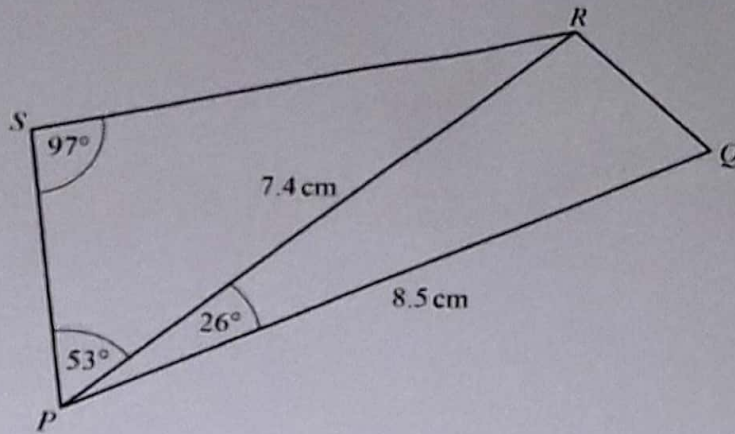
Find the value of $p$ and of $q$.

$\left( \dfrac{72}{360} \times 2 \times \pi \times 6 \right) + 6 + 6$

$= \dfrac{12}{5}\pi + 12$

NOT TO SCALE

6 cm

72°

6 cm

$p = 12$

$q = 12/5$

Answer: ...... [3]

10

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R

S

97°

7.4 cm

26°

53°

P

8.5 cm

Q

NOT TO
SCALE

Calculate

(a) *SR*,

$$\frac{7.4}{\sin(97)} = \frac{SR}{\sin(53)}$$

$$SR = \frac{\sin(53) \times 7.4}{\sin(97)} = 5.95$$

✓

*Answer:* ........ 5.95 cm ........ [3]

(b) *RQ*.

$$RQ = \sqrt{(7.4)^2 + (8.5)^2 - (2 \times 8.5 \times 7.4) \times \cos(26)}$$

$$= 3.73$$

*Answer:* ........ 3.73 cm ........ [4]

**- END OF EXAMINATION -**

11