EXAMINATIONS COUNCIL OF ESWATINI
Eswatini General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

MATHEMATICS **6880/02**

Paper 2 Calculator Structured Questions (Core and Extended) **October/November 2020**

2 hours

Candidates answer on the Question Paper.

Additional Materials: Scientific calculator
Geometrical Instruments
Mathematical tables (optional)
Tracing paper (optional)

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on the spaces provided.
Write in dark blue or black pen in the spaces provided on the Question Paper.
You may use a pencil for any diagrams or graphs.
Do **not** use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions.
All working should be clearly shown below that question.

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

Scientific calculators should be used.
If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures.
Give answers in degrees to one decimal place.
For π, use either your calculator value or 3.142.

The total of the marks for this paper is 90.

For Examiner's Use	
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Total	

This document consists of **16** printed pages.

1 **(a)** You are given that $\mathbf{W} = \begin{pmatrix} -5 & 2 & 1 \\ 3 & -4 & 7 \end{pmatrix}$.

(i) State the order of matrix **W**.

Answer (a)(i) ..... [1]

(ii) Work out $-2\mathbf{W}$.

Answer (a)(ii) ..... [2]

(b) You are given that $\mathbf{A} = \begin{pmatrix} 3 & -2 \\ 1 & q \end{pmatrix}$, $\mathbf{B} = \begin{pmatrix} 2 & m \\ 3 & 5 \end{pmatrix}$ and $\mathbf{C} = \begin{pmatrix} 4 & -2 \\ -1 & -11 \end{pmatrix}$.

Find the value of m and the value of q, given that $2\mathbf{A} - \mathbf{B} = \mathbf{C}$.

Answer (b) $m =$ ..... [2]

$q =$ ..... [2]

2 Show that

(a) $4\frac{1}{3} - 2\frac{3}{5} = 1\frac{11}{15}$,

.....

.....

.....

..... [3]

(b) $2.35 + 4.2 \times 1.07 - (3.02 + 0.173) = 3.651$.

.....

.....

.....

..... [3]

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3 You are given that $a = 2.7 \times 10^4$, $b = 7.5 \times 10^5$ and $c = 6.3 \times 10^6$.

Evaluate the following expression, giving your answer in standard form.

$$\frac{a + b}{c}$$

Answer ..... [3]

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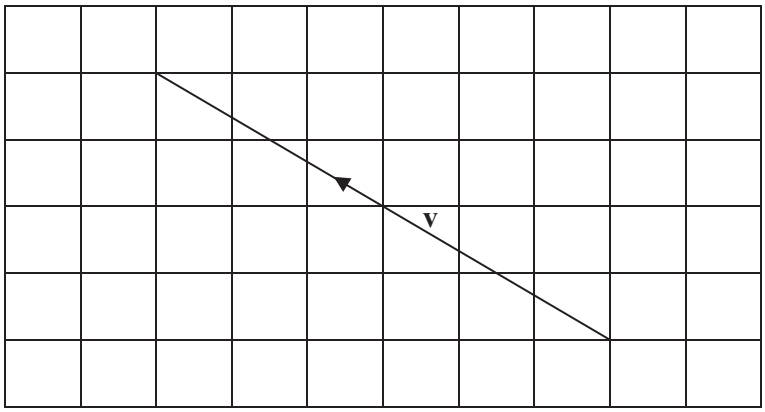
4 A vector, **v**, is drawn on the grid below.



(a) Write down **v** as a column vector.

Answer (a) ..... [2]

(b) Calculate the length of **v**.

Answer (b) ..... [2]

5 **(a)** Factorise $x^2 - 81$.

Answer (a) ..... [2]

(b) You are given the equation $(2x - y)(m - 5) = m(x - 1)$.

Find the value of m when $x = 4$ and $y = -2$.

Answer (b) ..... [3]

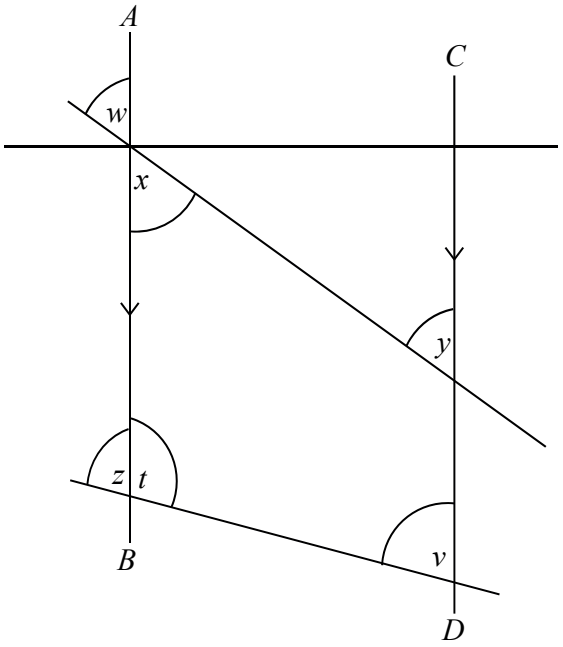
(c) The function $h(x) = 2x - 1$.

Solve for x when $h(x) = 5$.

Answer (c) $x =$ ..... [2]

[Turn over

6 In the following diagram line AB is parallel to CD.
There are three lines cutting AB and CD.
Angles t, v, w, x, y and z are shown in the diagram.



NOT TO SCALE

State the type of each pair of angles.

(a) x and y

Answer (a) ..... [1]

(b) v and t

Answer (b) ..... [1]

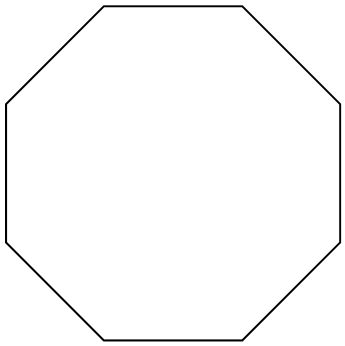
(c) z and v

Answer (c) ..... [1]

(d) x and w

Answer (d) ..... [1]

7 A regular eight sided polygon is shown below.



(a) Write the name of this polygon.

Answer (a) ..... [1]

(b) State the order of rotational symmetry of the polygon.

Answer (b) ..... [1]

(c) **(i)** Calculate the sum of the interior angles of the polygon.

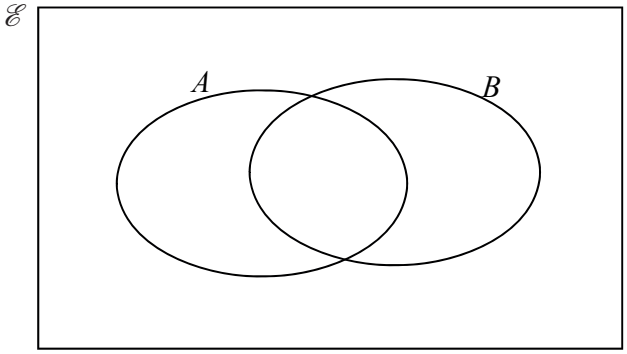
Answer (c)(i) .....° [2]

(ii) Calculate the size of each exterior angle of the polygon.

Answer (c)(ii) ..... ° [1]

8 $\mathscr{E} = \{5, 6, 7, 8, 9, 10, 11, 12\}$
$A = \{5, 6, 7\}$
$B = \{5, 6, 8, 9\}$

(a) Represent these sets in the Venn diagram.



[3]

(b) List the elements of

(i) $(A \cup B)'$,

Answer (b)(i) ..... [1]

(ii) $A \cap B'$.

Answer (b)(ii) ..... [1]

(c) Find n (A').

Answer (c) ..... [1]

9 **(a)** Solve for x in the following equations.

(i) $\frac{x+2}{2} - \frac{7x+2}{3} = 4$

Answer (a)(i) ..... [4]

(ii) $x^2 - 2x - 24 = 0$

Answer (a)(ii) $x =$ ..... *or* $x =$ ..... [3]

(b) Solve the following equations simultaneously.

$$2x - y = 5$$
$$x + 2y = -5$$

Answer (b) $x =$ ..... and $y =$ ..... [3]

[Turn over

10 The number of goals scored by each of 30 teams on a weekend are as follows:

2	3	4	0	2	2
3	5	2	3	2	1
4	0	5	4	1	0
0	1	3	2	1	2
1	2	1	0	4	1

(a) The following frequency table represents the information above.

Number of goals scored	**Frequency**
0	5
1	p
2	8
3	q
4	4
5	2

Find the values of p and q.

Answer (a) $p =$ ..... $q =$ ..... [2]

(b) Find the number of teams which scored at least 2 goals.

Answer (b) ..... [2]

(c) State the modal number of goals scored.

Answer (c) ..... [1]

(d) Find the median.

Answer (d) ..... [2]

(e) Calculate the mean number of goals scored.

Answer (e) ..... [3]

(f) A team is chosen at random.

Find the probability that the team scored

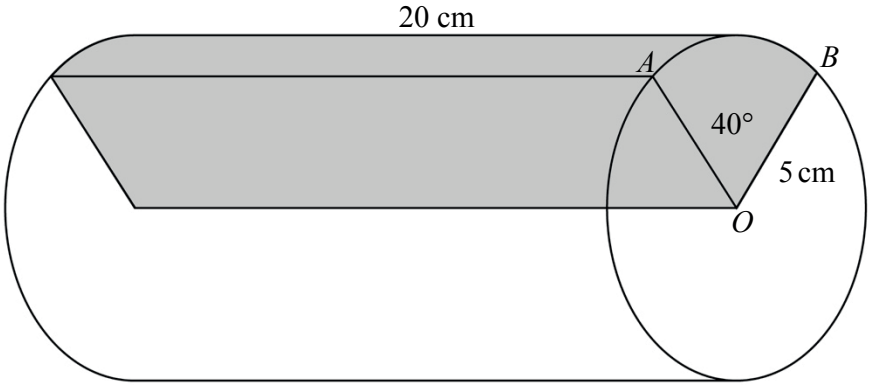
(i) 2 goals or fewer,

Answer (f)(i) ..... [2]

(ii) At least 4 goals.

Answer (f)(ii) ..... [2]

11 A piece of cheese is to be cut from a cylindrical block of cheese with centre O, radius 5 cm and length 20 cm.
The piece has a uniform cross section.
The cross section is sector AOB.
The sector angle is 40°.



(a) Calculate the number of identical pieces that can be cut from the complete cylindrical cheese.

Answer (a) ..... [1]

(b) Calculate

(i) the area of sector AOB,

Answer (b)(i) ..... cm^2 [2]

(ii) the total surface area of each piece of cheese,

Answer (b)(ii) ..... cm^2 [4]

(iii) the volume of each piece of cheese.

Answer (b)(iii) ..... cm^2 [2]

12 A straight line passes through the points $A(2, 2)$ and $B(3, 5)$.

(a) Find the gradient of line AB.

Answer (a) ..... [2]

(b) Find the equation of the line AB.

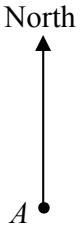
Answer (b) ..... [2]

(c) Write down the equation of the line parallel to line AB passing through point $C(0, -3)$.

Answer (c) ..... [1]

13 **(a)** There are three towns A, B, C.
Town A is 20 km away from town B.
The bearing of town B from town A is 120°.
Town C is also 20 km away from town B on a bearing of 220°.

(i) Use a scale of 1 cm to 4 km to show the positions of the three towns.



[4]

(ii) Measure the length AC in cm.

Answer (a)(ii) ..... cm [1]

(iii) Find the actual distance between town A and town C.

Answer (a)(iii) ..... km [2]

(iv) Measure the bearing of town C from town A.

Answer (a)(iv) ..... ° [1]

(b) Town *G* is due South-West of Town *H*.

Find the bearing of Town *H* from Town *G*.

Answer (b) ..... ° [2]