FORM TP 2026–020

TEST CODE **01234020**

JANUARY 2026

CARIBBEAN EXAMINATIONS COUNCIL

CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION

MATHEMATICS

HYBRID

Paper 02 – General Proficiency

2 hours 40 minutes

06 JANUARY 2026 (a.m.)

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

1. This paper consists of TWO sections: I and II.
2. Section I has SEVEN questions and Section II has THREE questions.
3. **All responses MUST be written in the answer booklet provided.**
4. Your responses MUST be written in English.
5. Numerical answers that are non-exact should be given correct to 3 significant figures or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.
6. All working MUST be clearly shown.
7. It is an offence to share your keycode with any other candidate or to log in with another candidate's details.
8. Any attempt to change the configuration of this machine, connect external devices, connect to external networks or to in any way initiate communication with resources other than the URL provided will result in your disqualification, you being shut out of the system and the cancellation of your entire test.

Required Examination Materials

Electronic calculator
Geometry set

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

LIST OF FORMULAE

Volume of a prism: $V = Ah$ where A is the area of a cross-section and h is the perpendicular length.

Volume of a cylinder: $V = \pi r^2 h$ where r is the radius of the base and h is the perpendicular height.

Volume of a right pyramid: $V = \frac{1}{3} Ah$ where A is the area of the base and h is the perpendicular height.

Circumference: $C = 2\pi r$ where r is the radius of the circle.

Arc length: $S = \frac{\theta}{360} \times 2\pi r$ where θ is the angle subtended by the arc, measured in degrees.

Area of a circle: $A = \pi r^2$ where r is the radius of the circle.

Area of a sector: $A = \frac{\theta}{360} \times \pi r^2$ where θ is the angle of the sector, measured in degrees.

Area of a trapezium: $A = \frac{1}{2}(a + b)\,h$ where a and b are the lengths of the parallel sides and h is the perpendicular distance between the parallel sides.

Roots of quadratic equations: If $ax^2 + bx + c = 0$,

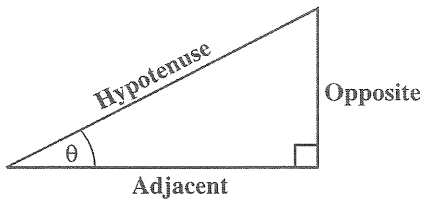
then $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Trigonometric ratios:

$$\sin\theta = \frac{\text{length of opposite side}}{\text{length of hypotenuse}}$$

$$\cos\theta = \frac{\text{length of adjacent side}}{\text{length of hypotenuse}}$$

$$\tan\theta = \frac{\text{length of opposite side}}{\text{length of adjacent side}}$$

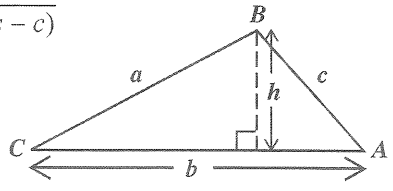


Area of a triangle: Area of $\Delta = \frac{1}{2} bh$ where b is the length of the base and h is the perpendicular height.

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

Area of $\Delta ABC = \sqrt{s(s-a)(s-b)(s-c)}$

where $s = \frac{a+b+c}{2}$



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

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

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SECTION I

Answer ALL questions.

All working must be clearly shown.

1. (a) (i) Express $\frac{4}{7} \div 12$ as a single fraction in its LOWEST terms. **(1 mark)**

(ii) Calculate the difference in value of the underlined digits in the numbers below.

$\underline{3}201_4$ and $6\underline{3}51_7$ **(3 marks)**

(b) By writing each number in the fraction below correct to 1 significant figure, find an INTEGER estimate for the value of

$$\frac{600 - 87.04}{29.6}.$$

(2 marks)

(c) Alana and Brentnol share \$17 400 in the ratio Alana : Brentnol = 8 : 7.

(i) Show that Alana receives \$9 280. **(1 mark)**

(ii) Alana invests her share of money into a business venture, earning simple interest at a rate of 4.5% per annum. She receives \$2 088 in interest. Determine the number of years that she invested her money. **(2 marks)**

Total 9 marks

2. (a) Factorize the expression $1 - t^2$. **(1 mark)**

(b) Expand and simplify the following expression.

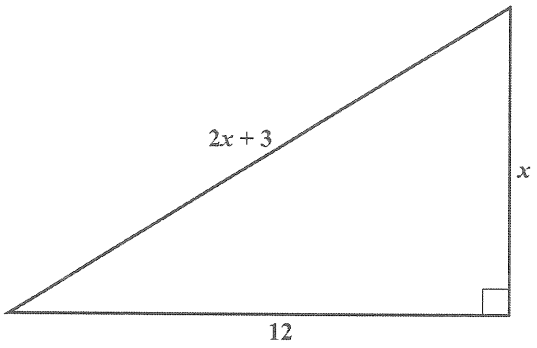
$$(4r - 5q)(3r + q) + 3qr$$

(2 marks)

(c) (i) Solve the inequality $-4p + 3 \geq 19 + 2p$. **(2 marks)**

(ii) Determine the LARGEST integer value of p that satisfies the inequality in (c) (i). **(1 mark)**

(d) The diagram below shows a right-angled triangle with its dimensions given in terms of x.

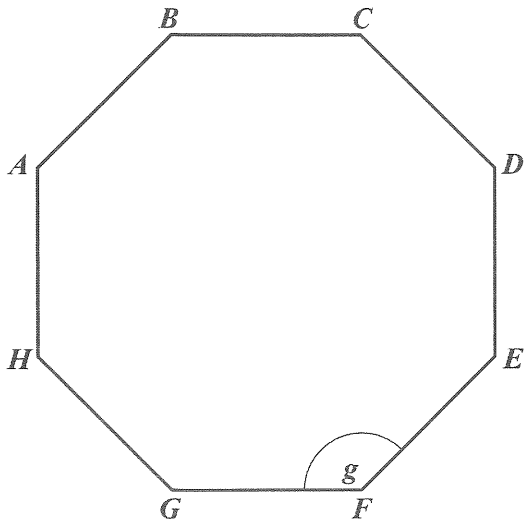


For the right-angled triangle, show that $x^2 + 4x - 45 = 0$.

(3 marks)

Total 9 marks

3. (a) *ABCDEFGH* is a **regular** octagon, with one of its internal angles marked *g*, as shown in the diagram below.

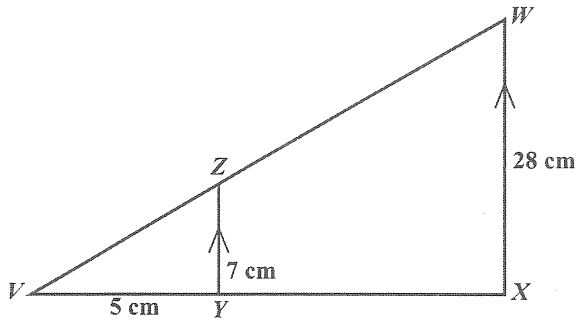


(i) Complete the statement below in relation to the diagram shown above.

The regular octagon has ..... lines of symmetry and rotational symmetry of order ..... . **(2 marks)**

(ii) Calculate the value of Angle *g*. **(2 marks)**

(b) The diagram below shows two similar, right-angled triangles drawn from a common vertex, V. The lines ZY and WX are parallel. Also, the lines $VY = 5$ cm, $ZY = 7$ cm and $WX = 28$ cm.



(i) Calculate the length of YX. **(3 marks)**

(ii) Determine the magnitude of Angle VWX. **(2 marks)**

Total 9 marks

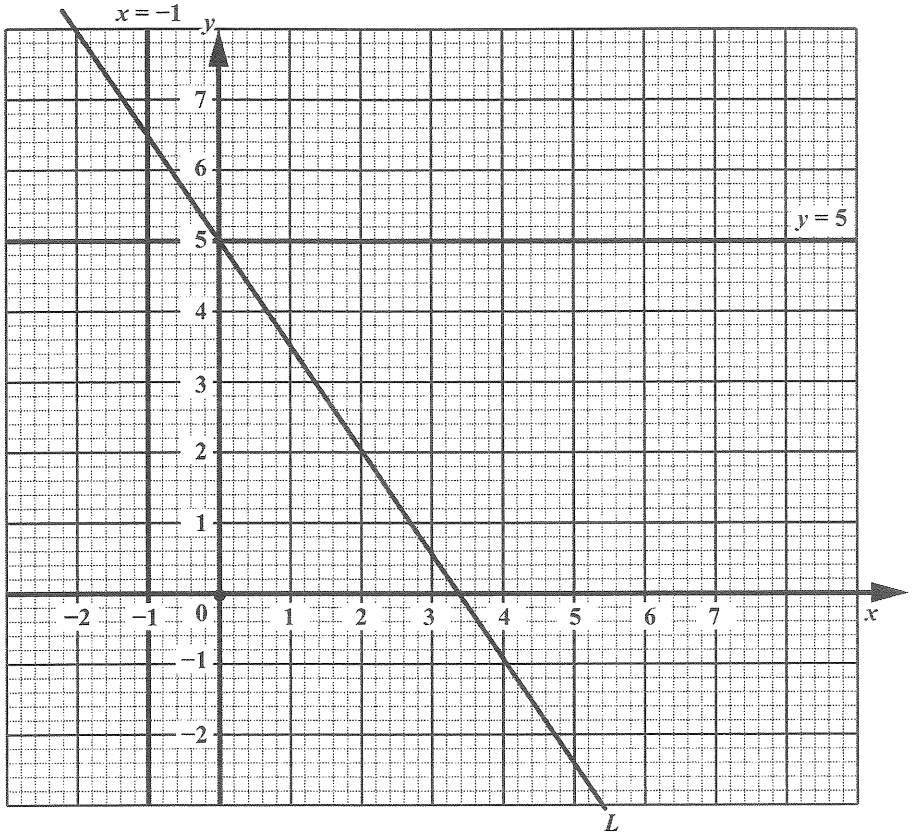
4. A straight line, L, whose equation is $3x + 2y = c$, passes through the point $(-2, 8)$.

(a) Show that the value of c is 10. **(1 mark)**

(b) Determine the gradient of L. **(2 marks)**

(c) The line with equation $3x + 4y = 8$ intersects the line L at the point T. Determine the coordinates of the point T. **(3 marks)**

(d) The diagram below shows the graph of L and two other lines, $x = -1$ and $y = 5$.



On the graph above, draw the line $y = x - 1$ and shade the region that satisfies the inequalities listed below.

$x \geq -1$

$y \leq 5$

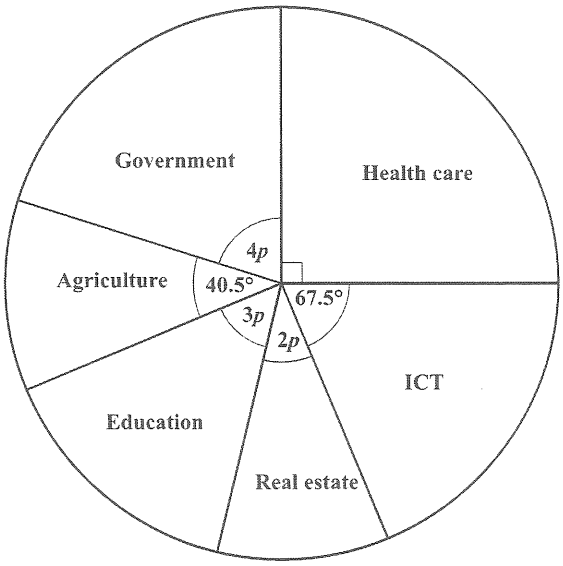
$y \geq x - 1$

$3x + 2y \leq 10$

(3 marks)

Total 9 marks

5. (a) Some Grade 11 students were surveyed to determine the job sector in which they are most likely to seek employment after graduating. Their choices are represented on the pie chart shown below.



Calculate the

(i) percentage of students who are likely to seek employment within the agriculture and ICT sectors **(2 marks)**

(ii) value of p. **(3 marks)**

(b) Liz has a set of red, yellow, and white buttons in a sack. She chooses a button at random.

The probability that she chooses a yellow button is 0.3.

The probability that she chooses a white button is 0.1.

(i) Determine the probability that Liz chooses a red button. **(2 marks)**

(ii) If there were 80 buttons in the sack originally, determine the number of buttons that were red or yellow. **(2 marks)**

Total 9 marks

6. (a) A map is drawn to a scale of 1 : 20 000. On the map, 1 cm represents n km.

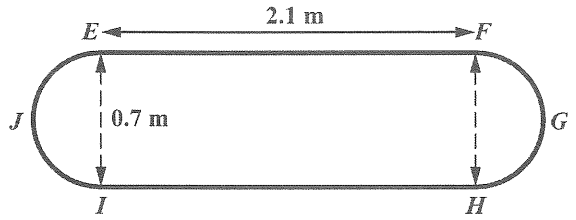
Determine the

(i) value of n **(1 mark)**

(ii) distance on the map, in cm, which corresponds to an actual distance of 4.8 km **(1 mark)**

(iii) actual area, in square kilometres, of a lake which has an area of 12 cm^2 on the map. **(2 marks)**

(b) The diagram below shows a running belt, *EFGHIJE*, that revolves around a running board on a treadmill. In the diagram, *EJI* and *HGF* are semicircles with a diameter of 0.7 m and *EFHI* is a rectangle.



[Use $\pi = \frac{22}{7}$]

(i) Calculate the length of the belt. **(2 marks)**

(ii) Glenda uses the equipment to exercise 4 times a week and runs at 9 km/h for 20 minutes each time.

Calculate the number of complete revolutions the running belt makes in one week during Glenda's exercise routine.

[Assume that the running belt moves at the same speed as Glenda.]

(3 marks)

Total 9 marks

7. The diagram below shows the first 4 figures in a sequence of figures made up of squares of unit length.

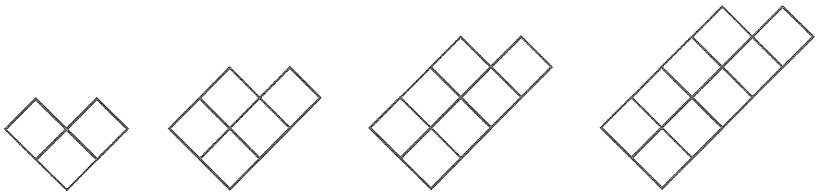
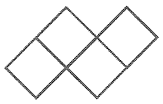


Figure 1 **Figure 2** **Figure 3** **Figure 4**

(a) Complete the diagram below to show Figure 5.



(2 marks)

(b) The number of squares, Q, the number of sticks, S, and the perimeter of each figure, P, follow a pattern. The values for Q, S and P for the first 4 figures are shown in the table below. Study the pattern of numbers in each row of the table and answer the questions that follow.

Complete the rows marked (i), (ii) and (iii) in the table below.

	Figure Number (D)	**Number of Squares (Q)**	**Number of Sticks (S)**	**Perimeter (P)**	
	1	3	10	8	
	2	5	15	10	
	3	7	20	12	
	4	9	25	14	
(i)	5	_____	_____	16	**(2 marks)**
	⋮	⋮	⋮	⋮	
(ii)	_____	47	120	_____	**(2 marks)**
	⋮	⋮	⋮	⋮	
(iii)	n	_____	_____	_____	**(3 marks)**

(c) Mala says that she can make one of the figures with EXACTLY 502 squares. Explain why she is incorrect. **(1 mark)**

Total 10 marks

SECTION II

Answer ALL questions.

ALGEBRA, RELATIONS, FUNCTIONS AND GRAPHS

8. (a) The functions f and g are defined as follows.

$f : x \rightarrow x^2 + 3, x \geq 0$

$g : x \rightarrow 2x + 2, x \in R$

(i) Calculate the value of $g(-1)$. **(1 mark)**

(ii) Write down an expression for $f^{-1}(x)$. **(2 marks)**

(b) (i) Derive a simplified expression for $gf(x)$. **(2 marks)**

(ii) Given that $fg(x) = 4x^2 + 8x + 7$, solve the following equation.

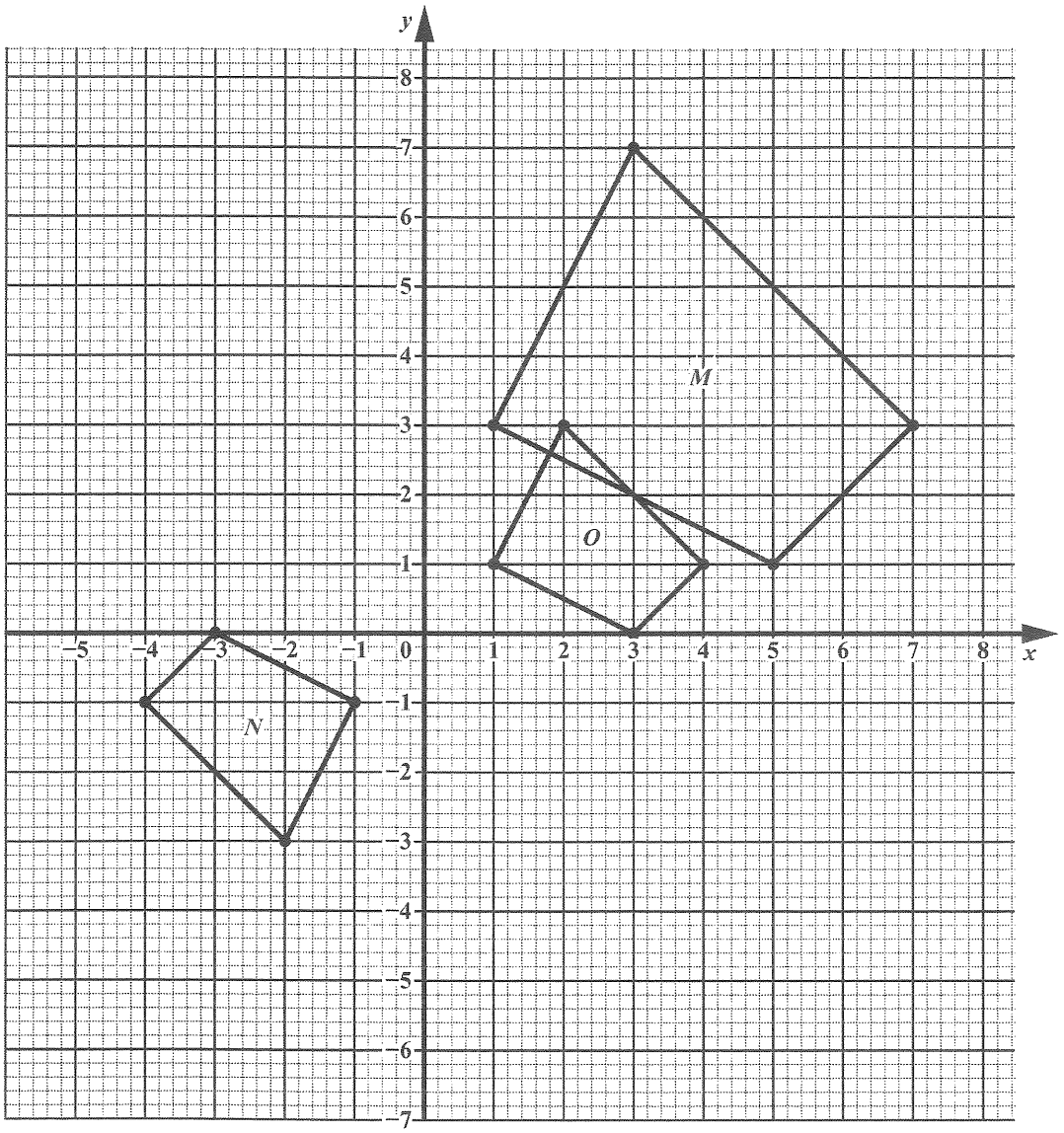
$fg(x) = 2gf(x) + 15$ **(3 marks)**

(c) On the grid provided in the answer booklet, plot the graph of the functions f and g, for $x \geq 0$. **(4 marks)**

Total 12 marks

GEOMETRY AND TRIGONOMETRY

9. (a) The diagram below shows quadrilaterals O, M and N. Quadrilaterals M and N are the images of Quadrilateral O after it has undergone 2 different transformations.



(i) Describe fully the **single** transformation that maps Quadrilateral O onto Quadrilateral M. **(3 marks)**

(ii) Describe fully the **single** transformation that maps Quadrilateral O onto Quadrilateral N. **(3 marks)**

GO ON TO THE NEXT PAGE

(iii) On the diagram **on page 24**, draw the image of Quadrilateral O after it undergoes the following transformations.

a) Translation by the vector $\begin{pmatrix} -5 \\ 2 \end{pmatrix}$. Label this image L. **(1 mark)**

b) Reflection in the line $y = -1$. Label this image P. **(2 marks)**

(b) A buoy (B) and a lighthouse (L) are 95 km apart. The bearing of B from L is 230°.

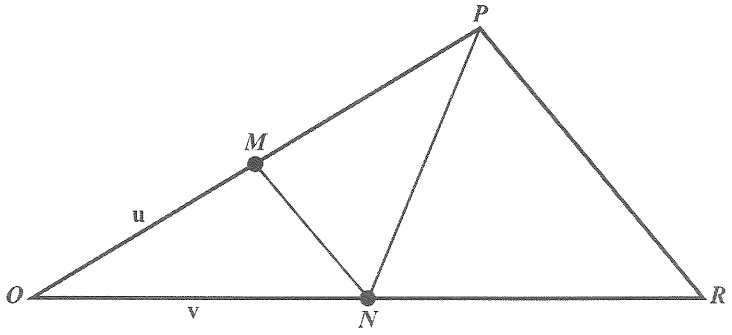
Using a scale of 1 cm : 10 km and the space provided below, complete the diagram to show the buoy (B) relative to the lighthouse (L). Indicate the given bearing on your drawing.

(3 marks)

Total 12 marks

VECTORS AND MATRICES

10. (a) The diagram below shows Triangle OPR. The point M is the midpoint of OP and the point N is the midpoint of OR. In the diagram, $\overrightarrow{OM} = \mathbf{u}$ and $\overrightarrow{ON} = \mathbf{v}$.



(i) Find in terms of **u** and **v**, simplified expressions for

a) $\overrightarrow{MN}$ **(1 mark)**

b) $\overrightarrow{NP}$ **(1 mark)**

(ii) Show that MN is parallel to PR. **(2 marks)**

(b) The matrix P, written in terms of a where a is a real constant, is as follows.

$$P = \begin{pmatrix} 3a & 4 \\ 6 & 2a \end{pmatrix}$$

(i) Calculate the determinant of P, in terms of a. **(1 mark)**

(ii) Determine the values of a for which Matrix P is singular. **(2 marks)**

(iii) Determine P^{-1}, the inverse of P, for which P is non-singular. **(2 marks)**

(c) Write down the 2×2 matrix that represents a

(i) counterclockwise rotation of 90° about the origin. Label this matrix X.

(1 mark)

(ii) counterclockwise rotation of 90° about the origin followed by a reflection in the y-axis, given that $Q = \begin{pmatrix} -1 & 0 \\ 0 & 1 \end{pmatrix}$ represents a reflection in the y-axis. Label this matrix T.

(2 marks)

Total 12 marks

END OF TEST

IF YOU FINISH BEFORE TIME IS CALLED, CHECK YOUR WORK ON THIS TEST.