FORM TP 2018088

TEST CODE **01234032**

MAY/JUNE 2018

**CARIBBEAN EXAMINATIONS COUNCIL**

**CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION**

**MATHEMATICS**

**Paper 032 – General Proficiency**

***1 hour***

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**Required Examination Materials**

Electronic calculator
Geometry set

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**LIST OF FORMULAE**

Volume of a prism — $V = Ah$ where $A$ is the area of the 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.

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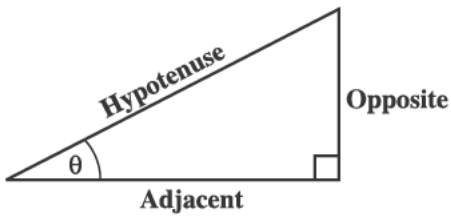
then $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

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

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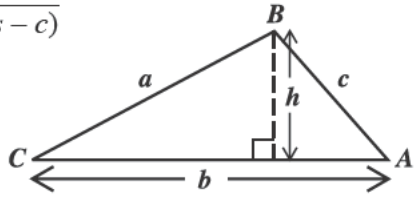



Area of a triangle — Area of $\Delta = \frac{1}{2}bh$ where $b$ is the length of the base and $h$ is the perpendicular height.

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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**1.** (a) The internal angles, in degrees, of a quadrilateral are $12x + 15$, $17x - 10$, $x + 50$ and $15x + 35$.

Find the value of $x$.

.....

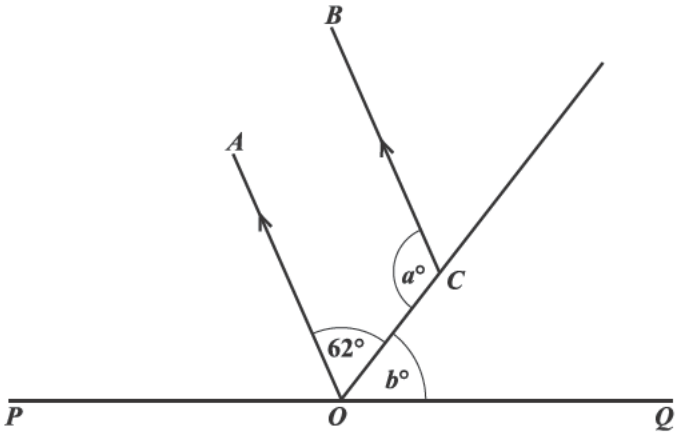
**(1 mark)**

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(b) The diagram below, **not drawn to scale**, shows four straight lines *POQ, OA, OC* and *CB*. *OA* is parallel to *CB*.




Given that *OA* **bisects** $P\hat{O}C$ and that $A\hat{O}C = 62°$, find the value of

(i) *a*

.....

**(1 mark)**

(ii) *b*.

.....

**(1 mark)**



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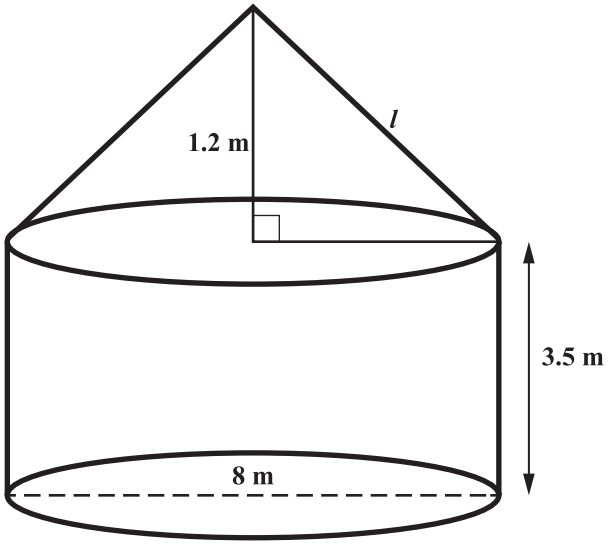
(c) For this question, you may find the following formulas, related to a cone, useful:

Volume = $\frac{1}{3}$ (base area) × (perpendicular height)

Curved surface area = $\pi r$ × (slant height)

A farmer constructs a storage tank as shown in the diagram below. The shape of the tank consists of a cylindrical body of height 3.5 m and diameter 8 m, and a conical roof of vertical height 1.2 m.

**Use $\pi$ = 3.14**




(i) Calculate the slanted height, $l$, of the roof of the tank.

.....

**(1 mark)**



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(ii) Assume that the storage tank is completely sealed and is to be filled with diesel from an opening at the top. Find the capacity, in $m^3$, of the tank, inclusive of the conical roof.

.....

**(2 marks)**

(iii) Show that the TOTAL curved surface area of the tank, to the nearest square metre, is 140 $m^2$.

.....

**(2 marks)**

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(iv) The farmer wishes to paint the **exterior** of the tank. Given that 1 gallon (1 gallon ≈ 3.79 litres) of paint covers 30 $m^2$ of the surface, determine the amount of paint needed, in litres, to completely paint the exterior of the tank.

.....

**(2 marks)**

**Total 10 marks**

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**2.** (a) A toy rocket is projected upwards from a point, $O$, on level ground and the vertical height it travels can be modelled by the quadratic function

$$h(x) = 40x - 8x^2,$$

where $x$ is the horizontal distance travelled from the point $O$.

(i) Find the vertical height of the rocket when it is 1 metre away from $O$.

.....

**(1 mark)**

(ii) Determine the distance from $O$ when the rocket returns to the ground.

.....

**(2 marks)**



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(iii) What is the value of $x$ when $h$ is greatest? Calculate the value of this greatest height.

.....

**(2 marks)**

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(b) $P$ is the point with coordinates $(-2, 3)$ and $Q$ is the point with coordinates $(-5, -1)$.

(i) Show that the gradient (slope), $m$, of the straight line that passes through the points $P$ and $Q$ is $m = \frac{4}{3}$.

.....

**(2 marks)**

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(ii) The equation of the straight line that is perpendicular to $PQ$ and passes through the point (5, 2) is

$$ax + by = c.$$

What are the values of $a$, $b$ and $c$?

.....

**(3 marks)**

**Total 10 marks**

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FORM TP 2019020

TEST CODE **01234032**

JANUARY 2019

**CARIBBEAN EXAMINATIONS COUNCIL**

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# MATHEMATICS

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***1 hour***

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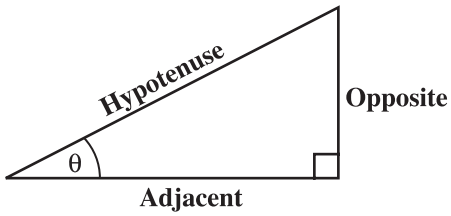
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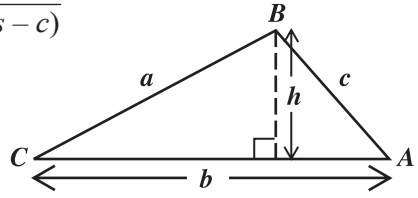
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$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$




Cosine rule

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

GO ON TO THE NEXT PAGE

**1.** (a) The information below represents the minimum temperatures, in °C, recorded in Country A for the first 20 days in a particular month.

21 23 25 22 24 25 23 26 23 24

25 26 23 25 23 25 24 25 25 25

(i) Complete the frequency table below, using the information above.

| Temperature (°C) | Tally | Frequency |
|---|---|---|
| 21 | \| | 1 |
| 22 | \| | 1 |
| 23 | | |
| 24 | \|\|\| | 3 |
| 25 | | |
| 26 | | |

**(2 marks)**

(ii) Determine the median temperature.

.....

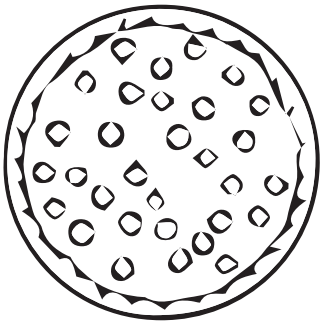
**(2 marks)**

(iii) Calculate the mean temperature for the twenty-day period.

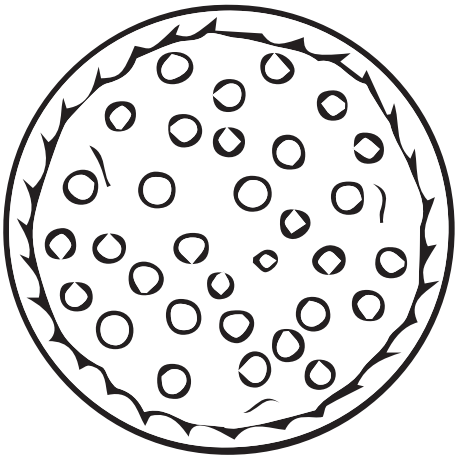
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**(1 mark)**

(b) The diagrams below represent the cross-sections of two circular pizzas, *A* and *B*. The pizzas are similar but vary in size. Pizza *A* has a diameter of 15 cm and Pizza *B* has a diameter of 30 cm.



**Pizza A**



**Pizza B**

(i) Determine, by calculation, if Pizza *B* is TWICE the size of Pizza *A*.

.....

**(3 marks)**

(ii) Pizza *B* is cut into 5 equal slices and is sold at $6.95 per slice, while Pizza *A* (is sold as a whole) at $9.95. Determine, with reason, which of the two options, (a slice of Pizza *B* or Pizza *A),* is the **better** buy for the customer.

.....

**(2 marks)**

**Total 10 marks**

**2.** (a) In a football tournament, points are awarded as follows: 3 points for a win, 1 point for a draw and 0 points for a loss.

(i) Write a $3 \times 1$ matrix, $P$, to represent this information.

.....

**(1 mark)**

During the tournament, Team Alpha recorded 5 wins, 1 draw and 3 losses, while Team Beta recorded 3 wins, 4 draws and 2 losses.

(ii) Write a $2 \times 3$ matrix, $R$, to represent this information.

.....

**(1 mark)**

(iii) Calculate the matrix product $RP$.

.....

**(2 marks)**

(iv) What does the matrix product $RP$ represent?

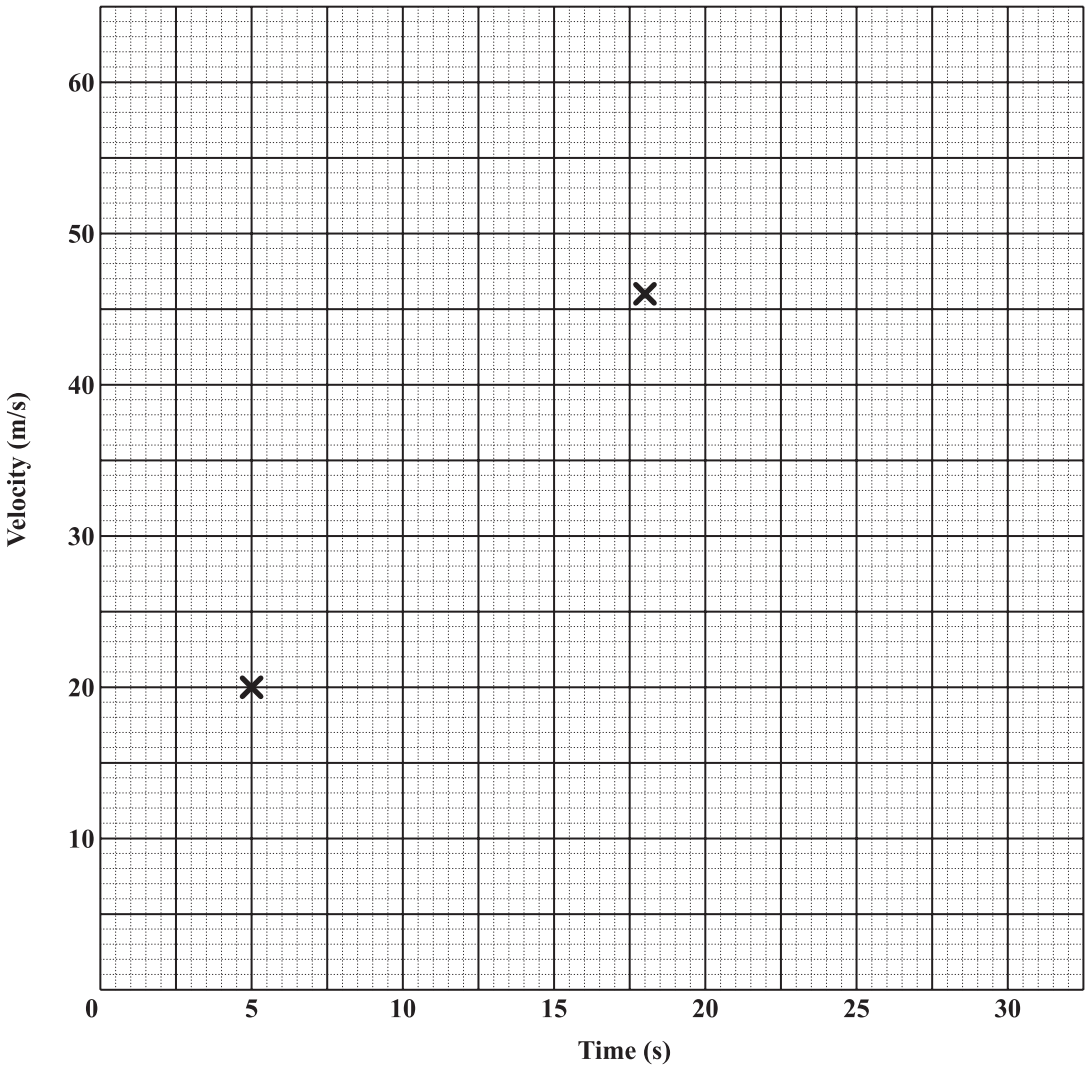
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**(1 mark)**

(b) The values recorded in the table below represent the velocity of an object over a period of time.

| **Velocity, *v* (m/s)** | 20 | 34 | 46 | 60 |
|---|---|---|---|---|
| **Time, *t* (s)** | 5 | 12 | 18 | 25 |

(i) On the grid below, two points are plotted. Plot the remaining two points on the grid and draw a line of best fit through the points.




**(2 marks)**

(ii) Given that the **linear** motion of the object can be expressed in the form $v = at + u$, where $a$ and $u$ are constants, use your graph to determine the values of $a$ and $u$.

.....

**(3 marks)**

**Total 10 marks**

**END OF TEST**

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FORM TP 2019091

TEST CODE **01234032**

MAY/JUNE 2019

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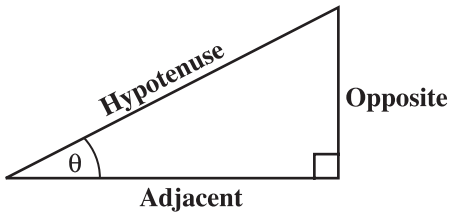
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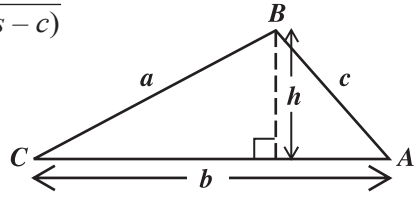



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**1.** A company which employs 10 unskilled and 8 skilled workers produces two models of a toy, Model A and Model B.

- Model A requires 20 hours of unskilled labour while Model B requires 15 hours of unskilled labour
- Model A requires 10 hours of skilled labour while Model B requires 25 hours of skilled labour

Each worker provides 40 hours of labour per week.

(a) Calculate the maximum number of hours available per week for

(i) unskilled labour

.....

**(1 mark)**

(ii) skilled labour

.....

**(1 mark)**

(b) Assume that the factory makes $x$ Model A and $y$ Model B toys per week. Show that the inequalities for the hours of labour are

(i) unskilled labour, $4x + 3y \leq 80$

.....

**(2 marks)**

(ii) skilled labour, $2x + 5y \leq 64$.

.....

**(1 mark)**

(c) Show, by calculation, that it is possible to make 15 Model A toys and 5 Model B toys.

.....

**(2 marks)**



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(d) The factory makes a profit of $40 on a Model A toy and $60 on a Model B toy each week.

(i) Write an equation for the TOTAL profit, $P$, per week, for making $x$ Model A and $y$ Model B toys.

.....

**(1 mark)**

(ii) What is the profit to the company when it makes 15 Model A toys and 5 Model B toys?

.....

**(1 mark)**

(e) Show that the profit calculated in (d) (ii) is NOT the maximum profit.

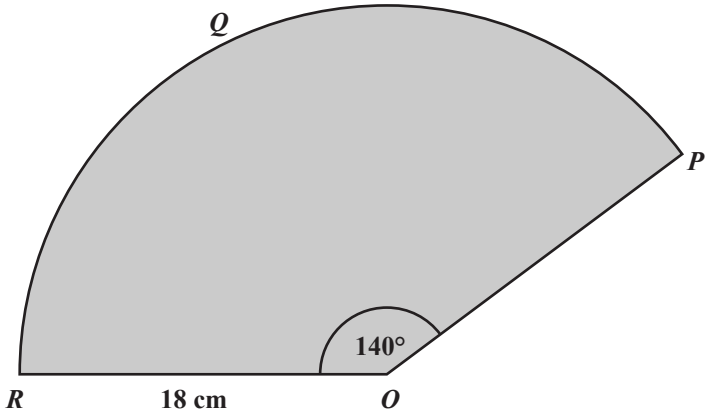
.....

**(1 mark)**

**Total 10 marks**

**2.** The diagram below, **not drawn to scale**, shows a flexible piece of card in the shape of a sector of a circle with centre *O* and radius 18 cm.

**Use $\pi = \frac{22}{7}$**




(a) Show that the perimeter of the card is 80 cm.

.....

**(3 marks)**

(b) Calculate the area of the card *OPQR*.

.....

**(2 marks)**

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(c) The card is bent and the edges *OP* and *OR* are taped together so that the card forms the curved surface of a cone with a circular base, *PQR*.

(i) Draw a diagram of the cone formed, showing clearly the measurement 18 cm, the perpendicular height, *h*, and the radius, *r*, of the base of the cone.

**(1 mark)**

(ii) Calculate the radius of the circular base of the cone.

.....

**(2 marks)**



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(iii) Using Pythagoras' theorem, or otherwise, determine the perpendicular height of the resulting cone.

.....

**(2 marks)**

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FORM TP 2020020

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JANUARY 2020

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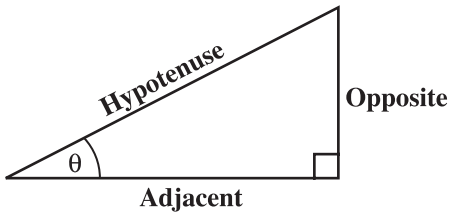
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$$\sin\theta = \frac{\text{length of opposite side}}{\text{length of hypotenuse}}$$

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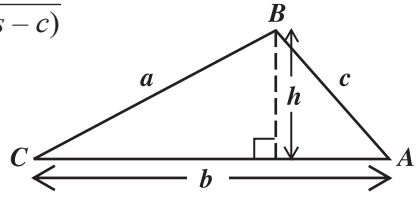



Area of a triangle — Area of $\Delta = \frac{1}{2} bh$ where $b$ is the length of the base and $h$ is the perpendicular height.

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

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

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




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

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**1.** (a) A hardware store has a sale on hammers, drills and spanners. A hammer is sold for \$15, a drill for \$75 and a spanner for \$25. **Customer A** bought 9 hammers, 14 drills and 2 spanners, and **Customer B** bought 8 hammers, 6 drills and 7 spanners.

(i) Construct the following matrices:

a) Matrix $P$, of order $3 \times 1$, to show the prices of the items on sale

.....

**(1 mark)**

b) Matrix $N$, of order $2 \times 3$, to show the number of items bought by the two customers

.....

**(1 mark)**

(ii) Calculate, using a matrix method, the TOTAL amount spent by EACH of the customers.

.....

**(2 marks)**

GO ON TO THE NEXT PAGE



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(b) Teacher Mabel is providing a meal for **all** the junior students in her school. Each student will have either a hamburger or a pizza. The cost of a hamburger is \$4 while the cost of a pizza is \$5. Let $x$ represent the number of hamburgers and $y$ the number of pizzas that she buys.

(i) Fill in the missing equations/inequalities in the table below to represent the conditions given in Column 2.

| | **Condition** | **Equation/Inequality** |
|---|---|---|
| a) | Each of the 220 students must get one meal. | _____ |
| b) | Teacher Mabel has no more than \$900 to cater for the meals for all of the students. | _____ |
| c) | She must buy more hamburgers than pizzas. | $x > y$ |

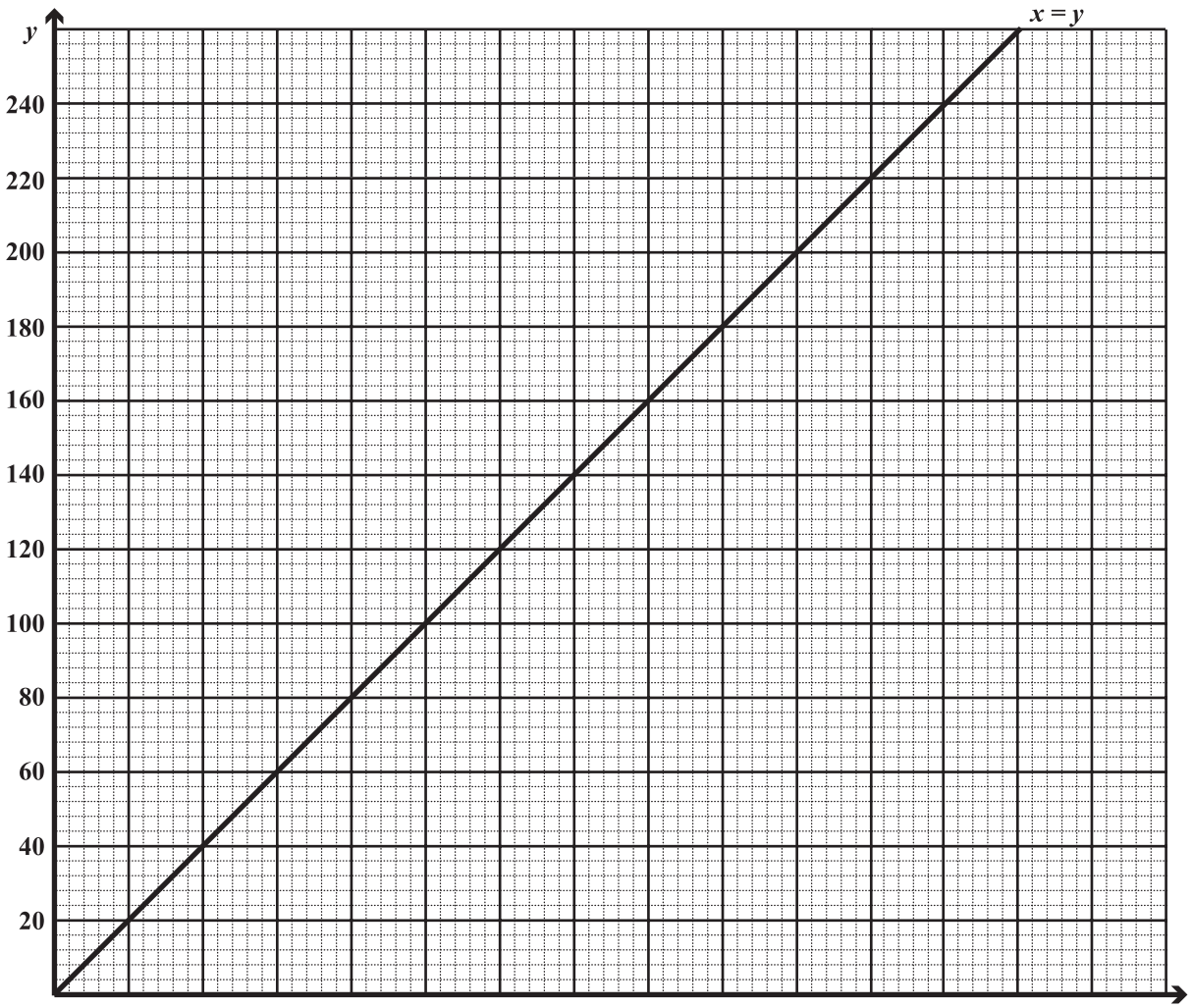
**(2 marks)**

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(ii) The line corresponding to the inequality $x > y$ is shown on the graph below. On the graph, draw the lines corresponding to the other two equations/inequalities in the table **on page 6**.




**(2 marks)**

(iii) Using your graph or otherwise, determine the MAXIMUM number of hamburgers and pizzas that Teacher Mabel can buy.

.....

**(2 marks)**

**Total 10 marks**

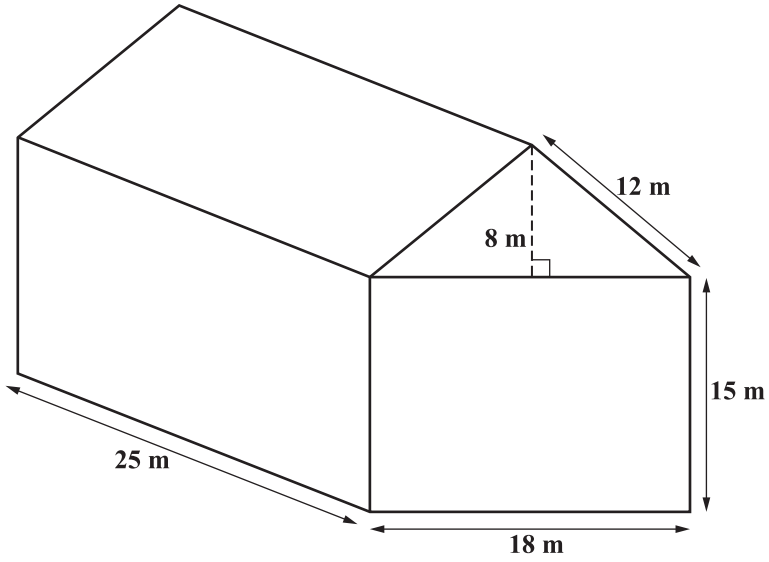
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**2.** John makes a wooden barn to store grains for his farm animals. The barn is in the shape of a prism with a pentagonal cross-section and has dimensions as shown in the diagram below.




(a) Show that the TOTAL **outer** surface area of the barn (excluding the floor) is 2 034 $m^2$.

.....

**(4 marks)**



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(b) (i) Given that 1 gallon of paint covers approximately 28 square metres of surface, determine the TOTAL amount of paint, **in litres**, that is needed to paint the outer surface area of the barn. (1 gallon ≈ 3.79 litres)

.....

**(3 marks)**

(ii) If the paint is sold in one-gallon containers only, how many containers of paint are needed to complete the job?

.....

**(1 mark)**



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(c) Determine the capacity (volume) of the barn.

.....

**(2 marks)**

**Total 10 marks**

**END OF TEST**

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FORM TP 2021020

TEST CODE **01234032**

JANUARY 2021

**CARIBBEAN EXAMINATIONS COUNCIL**

**CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION**

**MATHEMATICS**

**Paper 032 – General Proficiency**

***1 hour***

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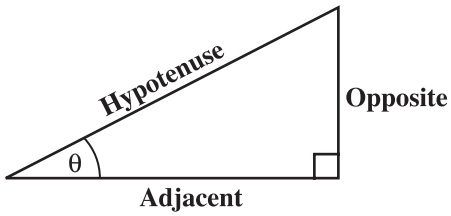
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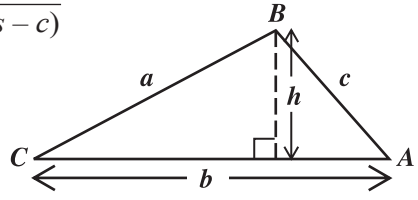



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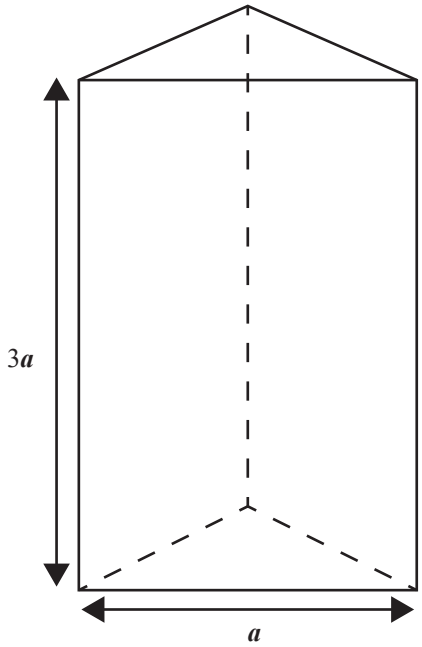
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**NOTHING HAS BEEN OMITTED.**

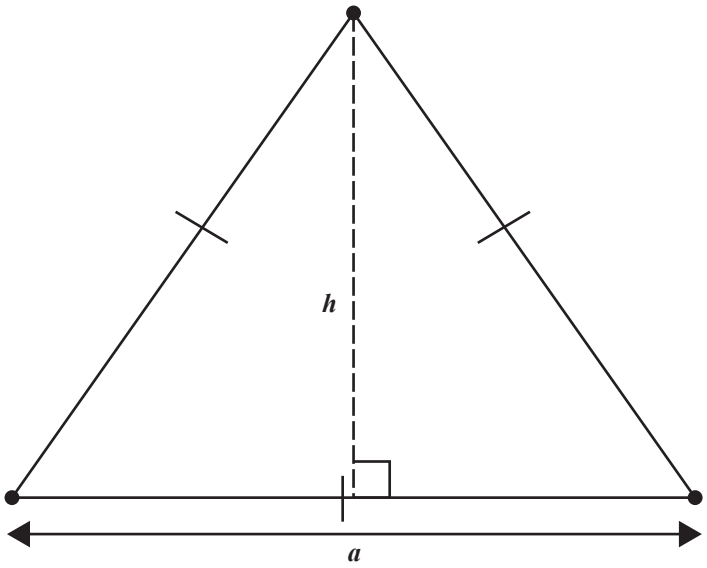


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**1.** The diagram below shows a container of length $3a$ that John made to store cooking oil. The cross-section of the container is an equilateral triangle of side $a$ and perpendicular height $h$.




(a) An enlarged diagram of the triangular cross-section of the container is shown below.




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Find the perpendicular height, $h$, in terms of $a$.

.....

**(3 marks)**

(b) Show that the area of the triangular cross-section, in terms of $a$, is $\frac{\sqrt{3}}{4}a^2$.

$\left[\textbf{Note}: \frac{\sqrt{3}}{4} \approx 0.433\right]$

.....

**(1 mark)**

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(c) Determine, in terms of $a$, the volume of the container. **Simplify your answer.**

.....

**(2 marks)**

(d) Given that $a = 10$ cm, calculate the depth of the oil in the container when John pours 800 $cm^3$ of oil into it.

.....

**(2 marks)**

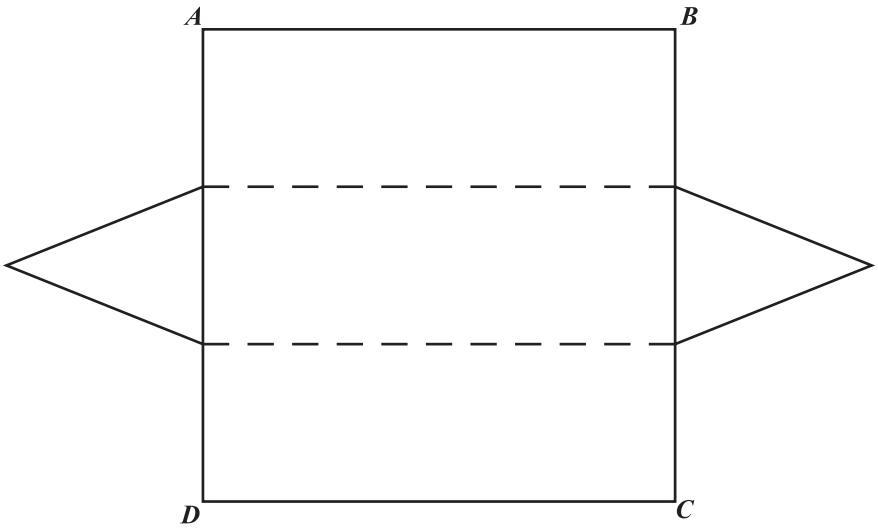
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(e) The diagram below shows the **net** of the container when it is opened.




Show that the area of the net, in terms of $a$, is $\frac{1}{2} a^2 (18 + \sqrt{3}) \approx 9.866\, a^2$.

(**Hint**: *ABCD* is a square.)

.....

**(2 marks)**

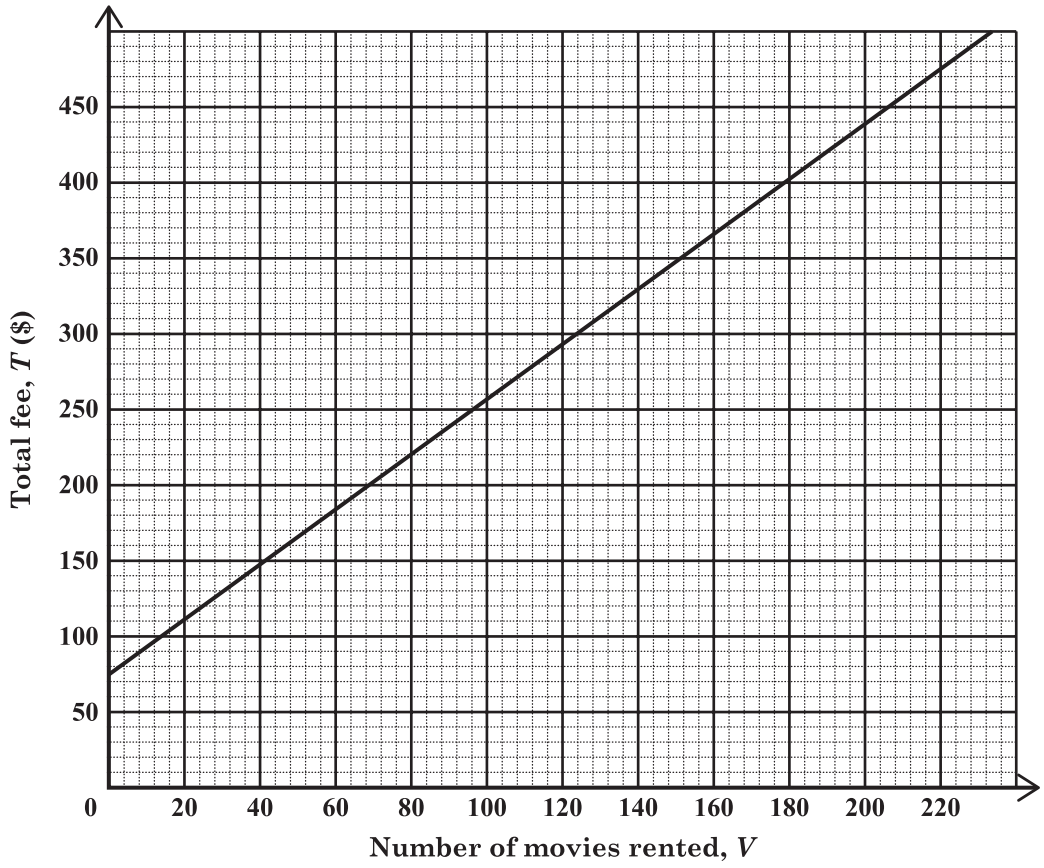
**Total 10 marks**



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**2.** Flagship Movie Rentals charges an annual membership fee plus an additional fee for the weekly rental of each movie.

The graph below shows the total fee, ($T$), as it varies with the number of movies rented, ($V$).




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(a) Using the graph, fill in the missing values in the table below.

| **Number of Movies Rented ($V$)** | **Total Fee, $T$ ($)** |
|---|---|
| _____ | 75 |
| 30 | 130 |
| 50 | _____ |
| 124 | 300 |

**(2 marks)**

(b) The total fee, $T$, is related to the number of movies rented, $V$, by the equation $T = mV + c$. Determine the value of

(i) $c$

.....

**(1 mark)**

(ii) $m$.

.....

**(1 mark)**



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(c) Complete the following statement.

According to the graph, the annual membership fee is $ ..... and the fee to rent one movie for a week is $ ..... . **(2 marks)**

(d) Brooke and her family budgeted $700 for renting movies for the year.

(i) Using an equation, or otherwise, determine the MAXIMUM number of movies they can rent.

.....

**(2 marks)**

(ii) At Rightstar Movie Rentals, there is no membership fee but Brooke will pay $1.95 to rent a movie for one week. From which of the two rental clubs would Brooke be able to rent more movies on the same budget? **Show calculations to justify your answer.**

.....

**(2 marks)**

**Total 10 marks**

**END OF TEST**

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FORM TP 2021094

TEST CODE **01234032**

MAY/JUNE 2021

**CARIBBEAN EXAMINATIONS COUNCIL**

**CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION**

**MATHEMATICS**

**Paper 032 – General Proficiency**

***1 hour***

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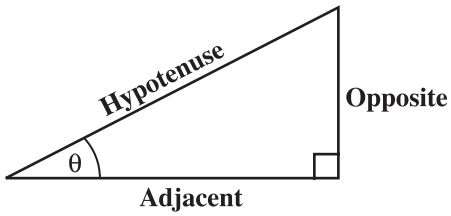
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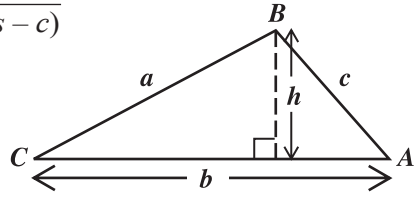



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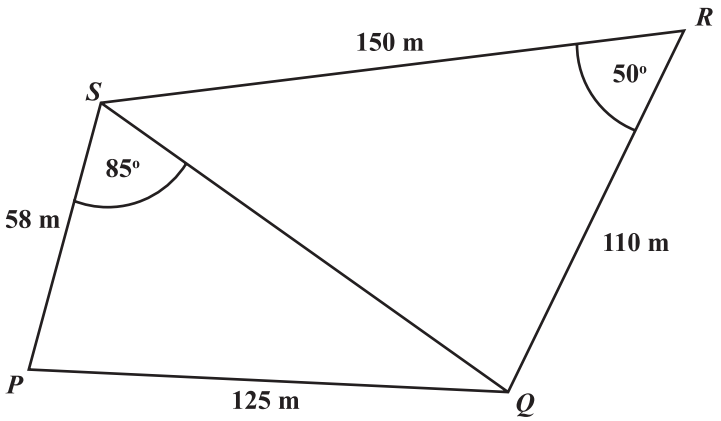
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**1.** The quadrilateral *PQRS* shown below represents a piece of land. A straight plywood wall is erected from *Q* to *S*, which divides the land into 2 triangular portions. The portion *QRS* is a flea market. *PQS* is a storage facility and a parking lot to serve the flea market.

The side *PS* = 58 m, *PQ* = 125 m, *SR* = 150 m and *QR* = 110 m.
Angle *QRS* = 50° and angle *PSQ* = 85°.




(a) Show that the length of the wall, *QS*, is 116 m, correct to the nearest metre.

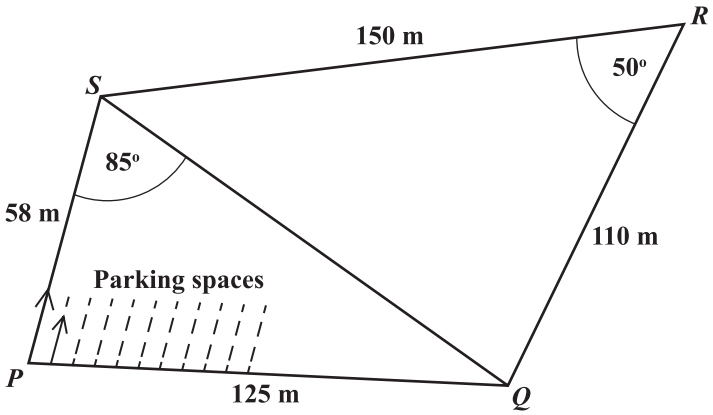
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**(2 marks)**



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(b) A parking lot with a number of parking spaces is to be installed along the side *PQ*. All the parking spaces run EXACTLY parallel to *PS*.




At what angle would the side of each parking space be inclined to *PQ*?

.....

**(3 marks)**

(c) Stalls are to be built on the land for the flea market in triangle *QRS*. Each stall is to be built on **at least** 20.4 $m^2$ of land and 2 000 $m^2$ of land MUST be used to build the aisles.

Calculate the MAXIMUM number of stalls which can be built. Show ALL working.

.....

**(3 marks)**

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(d) The company wishes to enclose the land, *PQRS*, with chain-link fencing. The table below shows the advertised cost price for chain-link fencing.

| **Quantity (m)** | **Price per Metre of Fencing ($)** |
|---|---|
| 200 or less | 25 |
| Between 200 and 500 | 21.50 |
| 500 or more | 18.50 |

Calculate the COST for the chain-link fencing required to enclose the land, *PQRS*. Show ALL working.

.....

**(2 marks)**

**Total 10 marks**

**2.** (a) A skydiver jumps from an aeroplane at Point *A* and after 10 seconds opens his parachute and falls at a constant rate. The graph below shows the height, *h*, that the skydiver is above the ground after *t* seconds.




(i) How far above the ground is the skydiver after 25 seconds?

.....

**(1 mark)**

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(ii) Calculate the slope of the line *BC* and explain what this value means in terms of *h* and *t*.

Explanation

.....

.....

.....

.....

**(3 marks)**

(iii) How long (in seconds) will the skydiver take to reach the ground, falling at the same rate as from *B* to *C*?

.....

**(1 mark)**

(iv) Another skydiver jumps from the aeroplane at A, falls at the same rate from A as the first skydiver, but opens his parachute after 20 seconds. He reached the ground at the same time found in (a) (iii), falling at a new constant rate after opening his parachute.

On the same pair of axes **on page 8**, draw the graph to represent this information.

**(2 marks)**

GO ON TO THE NEXT PAGE



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(b) Given that $\begin{pmatrix} x+y & 5 \\ 0 & x-y \end{pmatrix} = \begin{pmatrix} 9 & 5 \\ 0 & 7 \end{pmatrix}$, determine the values of $x$ and $y$.

.....

**(3 marks)**

**Total 10 marks**

**END OF TEST**

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FORM TP 2022020

TEST CODE **01234032**

JANUARY 2022

**CARIBBEAN EXAMINATIONS COUNCIL**

**CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION**

# MATHEMATICS

**Paper 032 – General Proficiency**

***1 hour***

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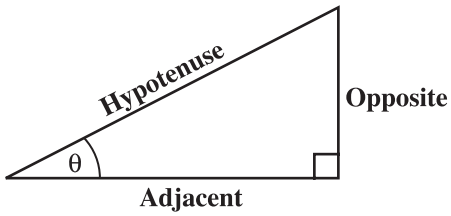
$$\text{then } x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

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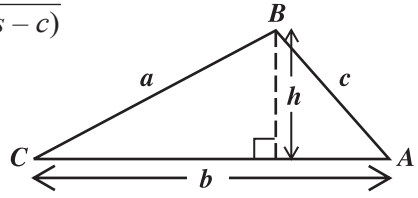



Area of a triangle — Area of $\Delta = \frac{1}{2} bh$ where $b$ is the length of the base and $h$ is the perpendicular height.

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

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

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




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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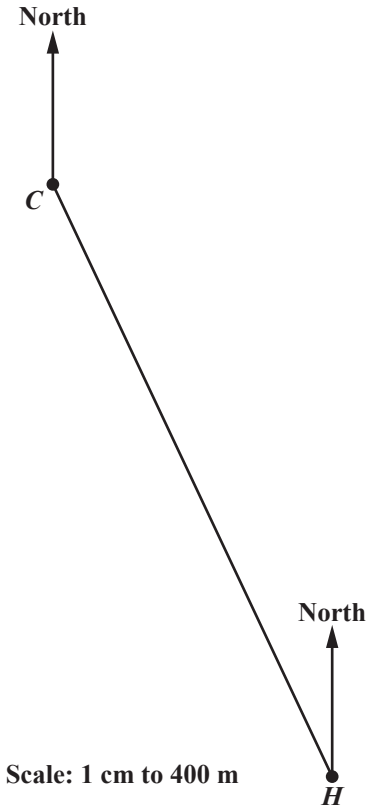
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**1.** The Crusaders and the Sea Hawks are two teams in a basketball tournament.

(a) The scale drawing below shows the relative position of the Crusaders Club, *C*, and the Sea Hawks Club, *H*, on a map. The scale on the drawing is 1 centimetre to 400 metres.




(i) Determine *CH*, the **actual distance**, **in kilometres**, between the two clubs.

.....

**(2 marks)**

(ii) The Greenwich Park Sports Arena, *G*, the venue for the tournament, is on a bearing of 120° from *C* and 085° from *H*.

On the scale drawing above, indicate the position of *G*, the venue for the basketball tournament. Show ALL reference lines and angles.

**(2 marks)**

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(b) Teams are given points for winning or drawing games. A win is given $x$ points and a draw is given $y$ points. No points are given when a team loses.

(i) The Crusaders have 24 points after winning 2 games and drawing 5 games.
The Sea Hawks have 29 points after winning 3 games and drawing 4 games.

Write TWO equations, in $x$ and $y$, to represent the information given above.

.....

**(2 marks)**

(ii) Using a matrix method, solve your two equations to find the number of points for a win and the number of points for a draw. Show ALL working.

.....

**(4 marks)**

**Total 10 marks**

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**2.** Karla invests in a poultry farm business. She buys $x$ number of chicks and $y$ number of ducklings to start up her business. She must consider the following information in determining the number of each of these two birds that she must buy to ensure she gains maximum profit.

- The number of chicks must be **at least twice** the number of ducklings.
- She must buy **at least** 80 ducklings.
- **Altogether**, Karla must buy **more than** 500 birds.

(a) Using the information above, complete the table below by inserting the inequality that represents each of the restrictions.

| **Restriction/Consideration** | **Inequality** |
|---|---|
| The number of chicks must be **at least twice** the number of ducklings. | |
| She must buy **at least** 80 ducklings. | $y \geq 80$ |
| **Altogether**, Karla must buy **more than** 500 birds. | |

**(2 marks)**

(b) Each chick costs \$2 and each duckling costs \$4. The maximum amount of money Karla can spend is \$1 400.

Show that $x + 2y \leq 700$ .

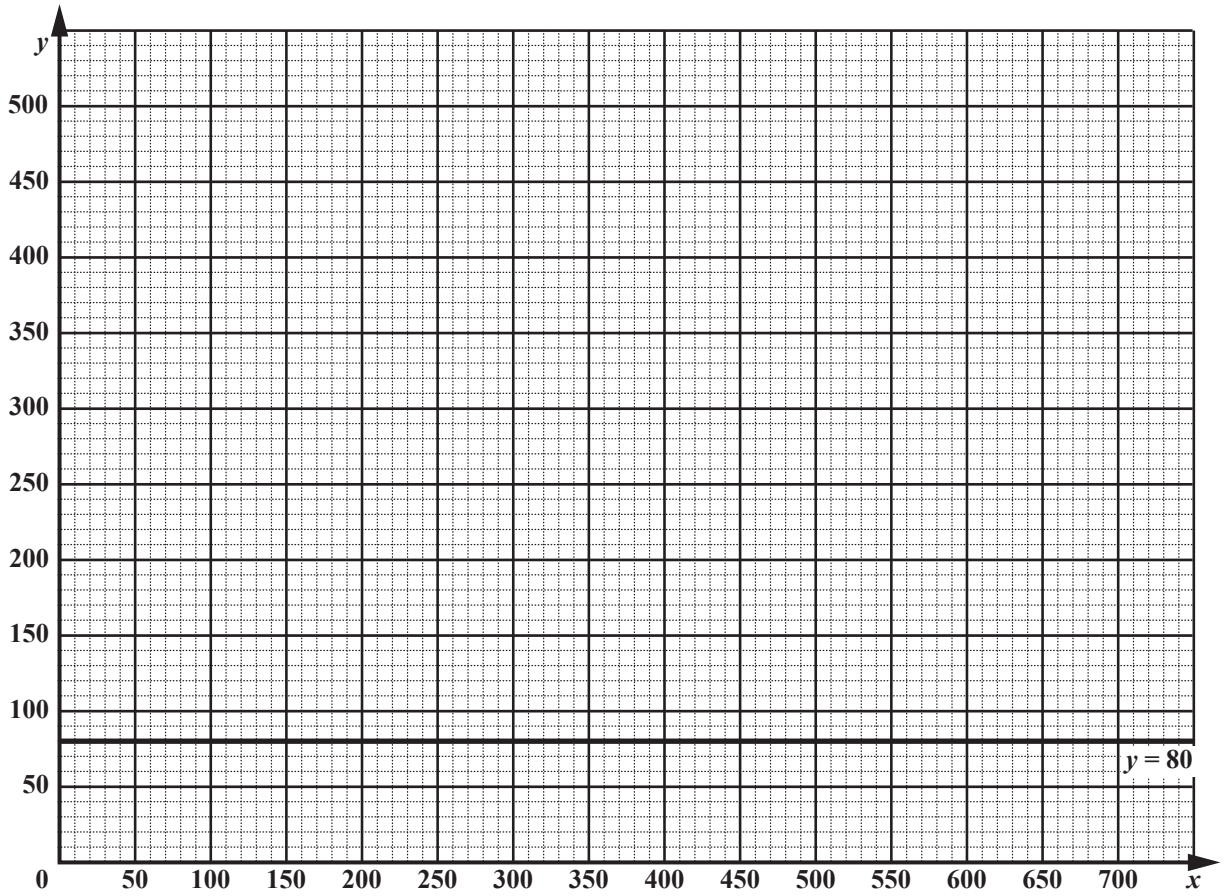
.....

**(1 mark)**



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(c) The line $y = 80$ is drawn on the grid below. Draw the THREE lines associated with the other inequalities given in (a) and (b). Label, as ***R***, the REQUIRED region which satisfies ALL four inequalities.




**(4 marks)**

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(d) The average weight of a chicken at the time of harvest is 2.75 kg and for a duck 2.28 kg. The current market trend indicates that the selling price per kilogram of chicken is $11.00 and for a kilogram of duck $12.50.

(i) Assuming that the information given above holds true, write an equation in $x$ and $y$ that represents Karla's TOTAL sales when she sells $x$ chickens and $y$ ducks.

.....

**(2 marks)**

(ii) Given that none of the birds will die prior to harvesting, advise Karla on the number of chicks and ducklings that she must buy to yield MAXIMUM sales.

.....

**(1 mark)**

**Total 10 marks**

**END OF TEST**

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FORM TP 2022095

TEST CODE **01234032**

MAY/JUNE 2022

**CARIBBEAN EXAMINATIONS COUNCIL**

**CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION**

# MATHEMATICS

**Paper 032 – General Proficiency**

***1 hour***

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**Required Examination Materials**

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**LIST OF FORMULAE**

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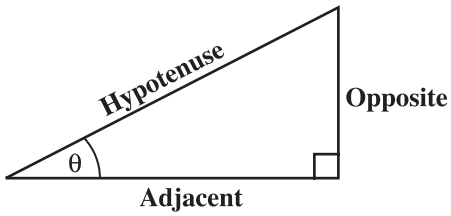
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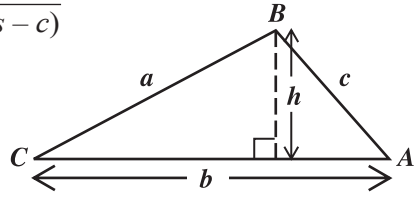



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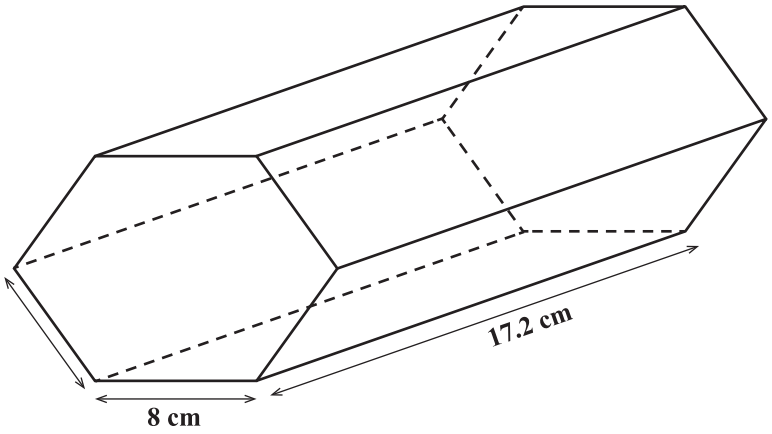


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**1.** $\left(\text{Use } \pi = \frac{22}{7} \text{ where required.}\right)$

The diagram below shows a solid bar of gold in the shape of a hexagonal prism of length 17.2 cm. The vertical cross-section of this prism is a **regular** hexagon with side of length 8 cm.




(a) (i) The formula for the area of any regular polygon is given by

$$\text{Area} = \frac{s^2 n}{4 \tan\left(\frac{180}{n}\right)}$$

where $s$ is the length of any side
$n$ is the number of sides of the regular polygon, and
tan is the tangent function calculated in **degrees**.

Using the formula above, calculate the area of the vertical cross-section of the hexagonal bar of gold.

.....

**(2 marks)**



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(ii) Determine the volume of the bar of gold.

.....

**(1 mark)**

(iii) Given that the density of gold is 19.3 g/cm$^3$, calculate the mass of the bar of gold, **to the nearest kilogram**.

$$\left(\text{Density} = \frac{\text{mass}}{\text{volume}}\right)$$

.....

**(2 marks)**

(iv) Calculate the TOTAL surface area of the bar of gold.

.....

**(2 marks)**



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(b) A jeweller melted 393 $cm^3$ of gold to make 6 identical spheres. Calculate the radius of EACH sphere.

$\left(\text{The volume, } V, \text{ of a sphere with radius } r \text{ is } V = \frac{4}{3}\pi r^3.\right)$

.....

**(3 marks)**

**Total 10 marks**

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**2.** (a) The distance a bus travels on a journey from City *A* to City *B* is 800 km.

(i) Write an expression, in terms of $x$, for the average speed of the bus, in km/h, when the journey takes

a) $x$ hours

.....

**(1 mark)**

b) $(x + 2)$ hours.

.....

**(1 mark)**

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(ii) The difference between the average speeds in (a) (i) is 20 km/h.

Show that $x^2 + 2x - 80 = 0$.

.....

**(3 marks)**

(iii) Solve the quadratic equation $x^2 + 2x - 80 = 0$ and hence, determine the average speed of the bus if the journey takes $(x + 12)$ hours.

.....

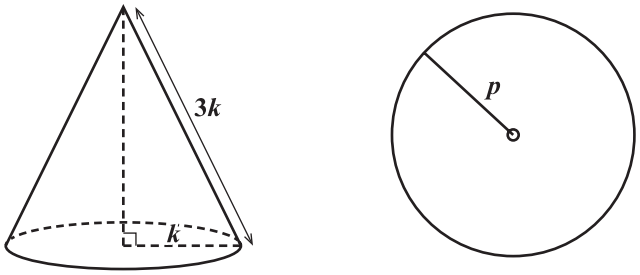
**(3 marks)**

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(b) The **total** surface area of a cone with radius $k$ and slant height $3k$ is equal to the area of a circle with radius $p$.




Show that $p = 2k$.

[The **total** surface area, $A$, of a cone with radius $r$ and slant height $l$ is $A = \pi r^2 + \pi rl$.]

.....

**(2 marks)**

**Total 10 marks**

**END OF TEST**

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FORM TP 2023021

TEST CODE **01234032**

JANUARY 2023

**CARIBBEAN EXAMINATIONS COUNCIL**

**CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION**

# MATHEMATICS

**Paper 032 – General Proficiency**

***1 hour***

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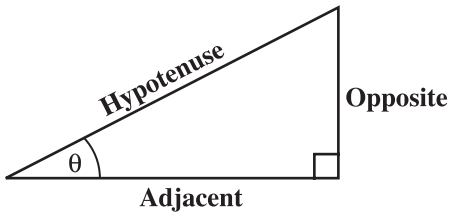
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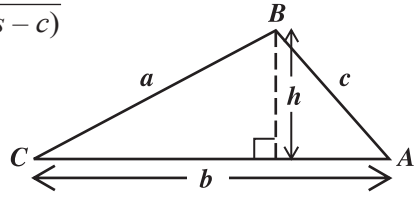



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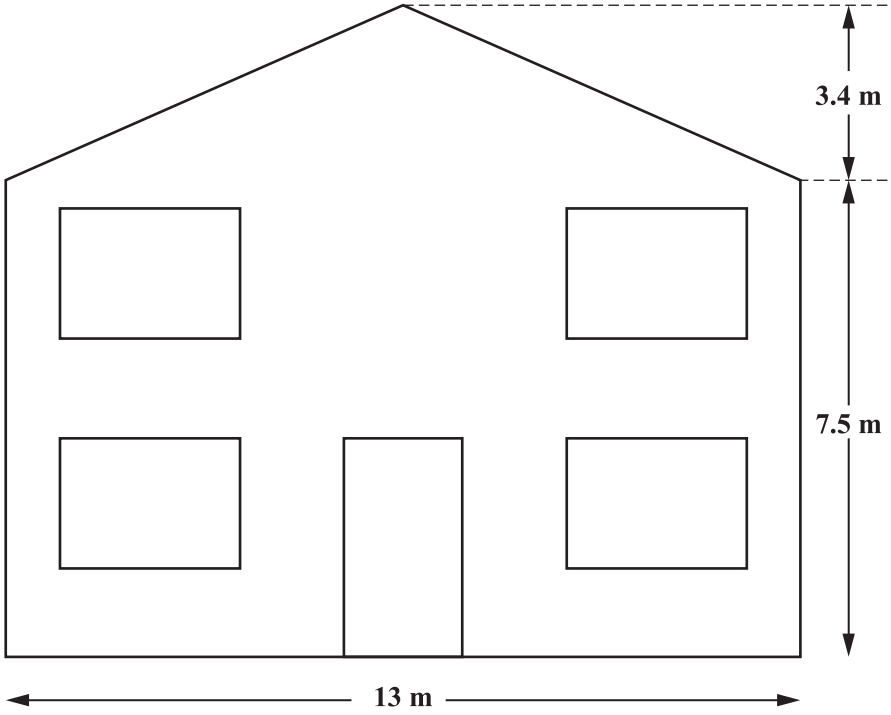
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**NOTHING HAS BEEN OMITTED.**



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**1.** The diagram below shows the front view of Pinky's house, which includes four windows and a door.




(a) (i) Calculate the TOTAL surface area of the front view of Pinky's house, inclusive of the windows and door.

.....

**(3 marks)**



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(ii) The windows and the door are made of shatterproof glass. The door is 1.2 m wide and 2.8 m high. Each of the four windows is 1.8 m wide and 1.4 m high.

Determine the MINIMUM amount of glass needed for the door and the four windows.

.....

**(3 marks)**

(iii) Pinky covers the front of her house, excluding the door and the four windows, with decorative wall tiles.

Calculate the area she covers with tiles.

.....

**(1 mark)**

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(b) Pinky paints one of the walls of the house which has an area of 53 $m^2$. One litre of paint covers an area of 4.5 $m^2$. Paint is sold in 2.5 litre tins, each costing $24.75. Pinky buys the LEAST number of tins of paint needed to paint this wall.

Calculate the cost of the paint required to paint the wall.

.....

**(3 marks)**

**Total 10 marks**

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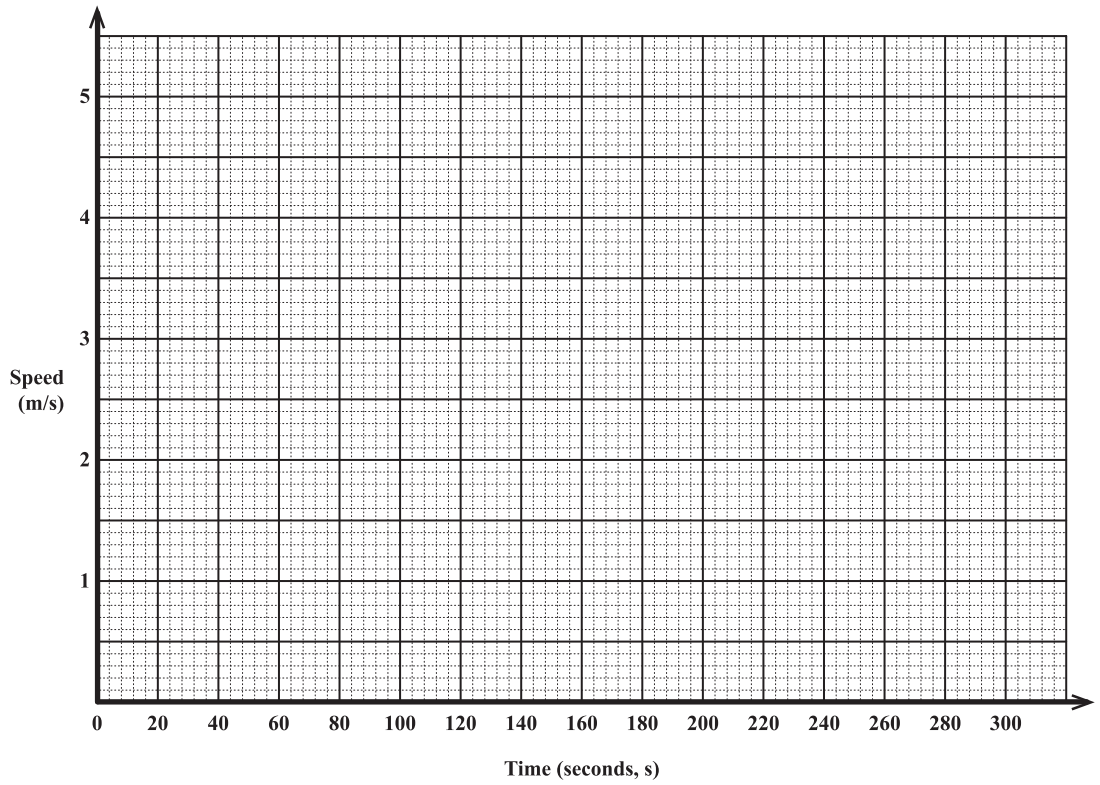


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**2.** (a) Lela cycles along a path for 5 minutes. She starts from rest, and accelerates at a constant rate until she reaches a speed of 5 m/s after 100 seconds. She continues cycling at 5 m/s for 2 minutes and 40 seconds. She then decelerates at a constant rate until she stops.

(i) On the grid below, draw a speed-time graph to show Lela's journey.




**(3 marks)**

(ii) Determine Lela's acceleration.

.....

**(1 mark)**



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(iii) Calculate Lela's average speed for the entire journey.

.....

**(3 marks)**

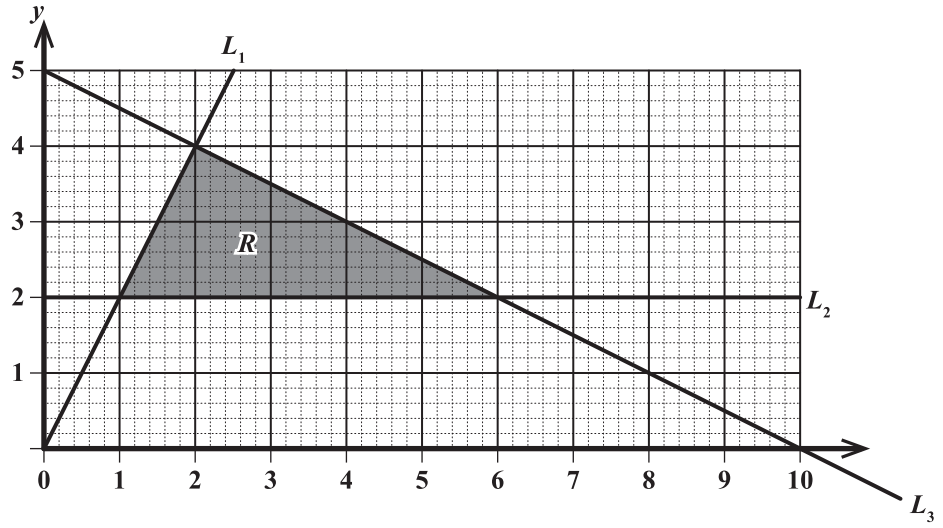


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(b) The diagram below shows the graph of 3 lines, $L_1$, $L_2$ and $L_3$ and the shaded region, $R$, which represents the common region for the 3 inequalities associated with the lines $L_1$, $L_2$ and $L_3$, that define $R$.




The table below shows some of the equations of the lines $L_1$, $L_2$ and $L_3$ and the respective inequalities that define the shaded region $R$.

| **Line** | **Equation of Line** (in the form $y = mx + c$) | **Inequality Associated with Line** |
|---|---|---|
| $L_1$ | $y = 2x$ | _____ |
| $L_2$ | $y = 2$ | _____ |
| $L_3$ | _____ | $2y \leq 10 - x$ |

Complete the table above by inserting the missing information. **(3 marks)**

**Total 10 marks**

**END OF TEST**

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FORM TP 2023099

TEST CODE **01234032**

MAY/JUNE 2023

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# MATHEMATICS

## Paper 032 – General Proficiency

***1 hour***

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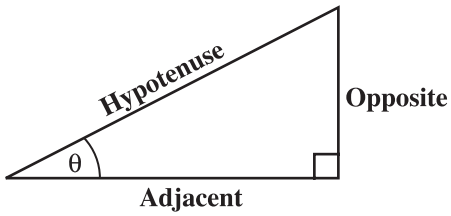
$$\text{then } x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Trigonometric ratios

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

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

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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.

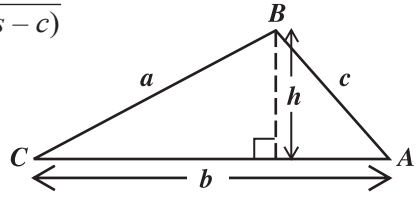
$$\text{Area of } \Delta ABC = \frac{1}{2} ab \sin C$$

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

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

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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"*"Barcode Area"*"
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**1.** (a) (i) Write down, in ASCENDING order, the two missing factors of 16.

1, ....., 4, ....., 16

**(1 mark)**

(ii) Write down the two missing factors of 16, in ASCENDING order, as powers of 2.

$2^0$, ....., $2^2$, ....., $2^4$

**(1 mark)**

(b) Given that $r$ is a prime number,

(i) state the four factors of $r^3$ as powers of $r$ (One has been written for you.)

$r^0$, ....., ....., .....

**(1 mark)**

(ii) state in terms of $n$, the number of factors of $r^n$.

.....

**(1 mark)**

(iii) a) Express 2 187 in the form $3^p$.

.....

**(1 mark)**

b) Hence, determine the number of factors of 2 187. **Do NOT write them out**.

.....

**(1 mark)**

GO ON TO THE NEXT PAGE



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(c) 40 is not a prime number.
$40 = 2^3 \times 5^1$ where 2 and 5 are prime numbers.

(i) Complete the table below by finding the factors of 40 that are missing.

| Power of 2 | Power of 5: $5^0$ | Power of 5: $5^1$ |
|---|---|---|
| $2^0$ | $2^0 \times 5^0 =$ ..... | $2^0 \times 5^1 = 5$ |
| $2^1$ | $2^1 \times 5^0 = 2$ | $2^1 \times 5^1 = 10$ |
| $2^2$ | $2^2 \times 5^0 = 4$ | $2^2 \times 5^1 = 20$ |
| $2^3$ | $2^3 \times 5^0 = 8$ | $2^3 \times 5^1 =$ ..... |

**(1 mark)**

(ii) The table above has 4 rows and 2 columns.

Describe how to find the number of factors of 40 using the number of rows and the number of columns.

.....

.....

.....

**(1 mark)**

(iii) a) Given that $5\,000 = 2^3 \times 5^4$, determine the number of factors of 5 000.

.....

**(1 mark)**

b) Write 1 944 in the form $2^p \times 3^q$, where $p$ and $q$ are integers, given that 1 944 has 24 factors.

.....

**(1 mark)**

**Total 10 marks**

GO ON TO THE NEXT PAGE



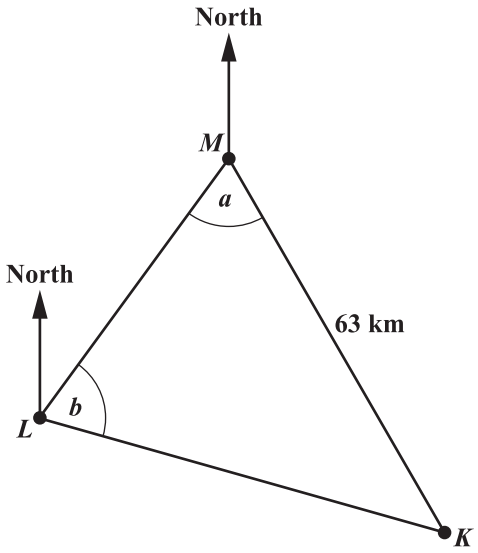
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**NOTHING HAS BEEN OMITTED.**

**2.** (a) The diagram below shows the positions of 3 small islands, *L*, *M* and *K*, located in a river. The bearing of *M* from *L* is 045°. The bearing of *K* from *L* is 126°. The bearing of *K* from *M* is 164°. The distance *MK* is 63 km.




(i) Determine the values of the angles *a* and *b*.

.....

**(2 marks)**



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(ii) Calculate the distance *LK*.

.....

**(2 marks)**

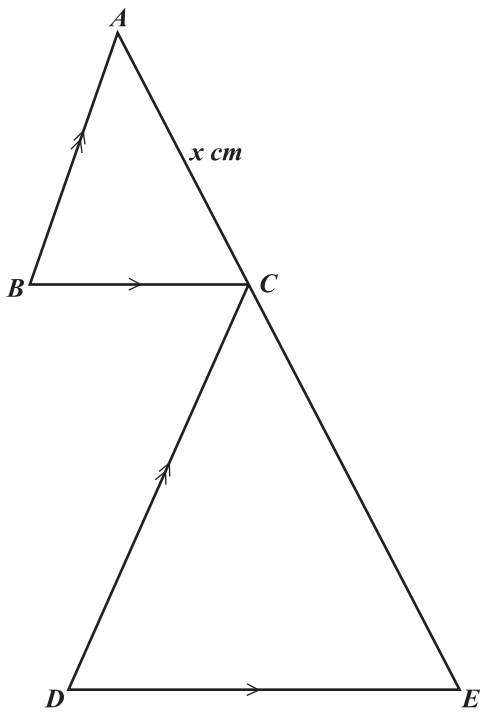
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(b) The diagram below shows a scaled drawing for part of a building plan. In the diagram, $BC$ is parallel to $DE$ and $BA$ is parallel to $DC$. $ACE$ is a straight line.

$AC = x$ cm, $BC = 3.5$ cm, $DE = 6.5$ cm and $AE = 12$ cm.




(i) Calculate the length $AC$.

.....

**(3 marks)**

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(ii) If the area of triangle *ABC* is 7 cm$^2$, determine the TOTAL area of the portion of the building, *ABCDE*, shown **on page 10**.

.....

**(3 marks)**

**Total 10 marks**

**END OF TEST**

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

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FORM TP 2024021

TEST CODE 01234032

JANUARY 2024

# CARIBBEAN EXAMINATIONS COUNCIL

## CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION

## MATHEMATICS

### Paper 032 – General Proficiency

*1 hour*

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**Required Examination Materials**

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**LIST OF FORMULAE**

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

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

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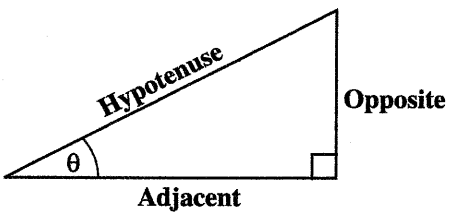
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Trigonometric ratios:

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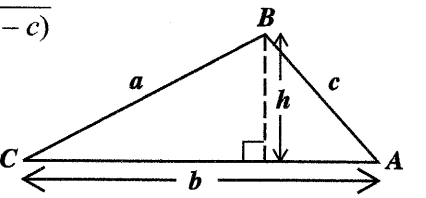



Area of a triangle: Area of $\Delta = \frac{1}{2}bh$ where $b$ is the length of the base and $h$ is the perpendicular height.

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

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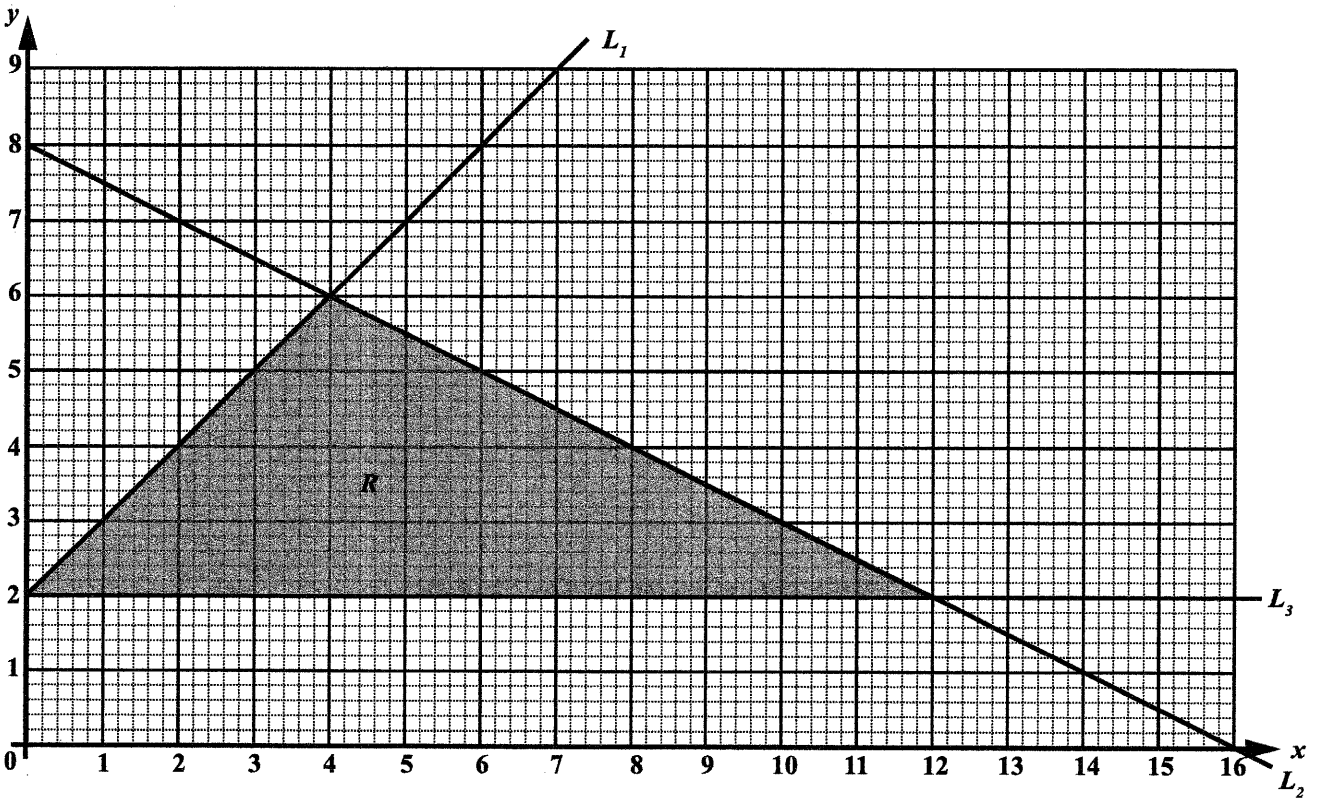
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**1.** (a) The diagram below shows the graph of 3 lines, $L_1$, $L_2$ and $L_3$, and a shaded region, $R$, which represents the common region for the 3 inequalities associated with the lines, $L_1$, $L_2$ and $L_3$, that define $R$.




(i) The table below shows the equation of $L_3$ and the respective inequality associated with the shaded region, $R$.

| Line | Equation of Line | Inequality Associated with Line |
|---|---|---|
| $L_1$ | _____ | _____ |
| $L_2$ | _____ | _____ |
| $L_3$ | $y = 2$ | $y \geq 2$ |

Complete the table above by filling in the missing information for $L_1$ and $L_2$. Write the equations in the form $y = mx + c$. **(4 marks)**

(ii) A toy manufacturer makes $x$ phones and $y$ trucks. The cost to make a phone is \$75 and the cost to make a truck is \$200. The shaded region, $R$, in the diagram **on page 6** represents the only possible number of toy phones and toy trucks the manufacturer can make.

Using the graph, determine the number of phones and the number of trucks which give the GREATEST possible total cost of production. Write down this greatest possible total cost of production.

..... phones ..... trucks

Greatest possible total cost of production = \$ .....

**(2 marks)**





(b) Over time, the company makes a total of 120 toys. Each toy, whether a phone or a truck, is either blue, red or green in colour. Other information regarding the toys is as follows.

- 48 toys are phones.
- 77 toys are blue.
- 5 toy trucks are red in colour.
- 36 toys are green.
- $\frac{4}{9}$ of the green toys are phones.

(i) Complete the table below to show this information.

| | **Blue** | **Red** | **Green** | **Total** |
|---|---|---|---|---|
| **Phone** | | | | |
| **Truck** | | | | |
| **Total** | | | | 120 |

**(3 marks)**

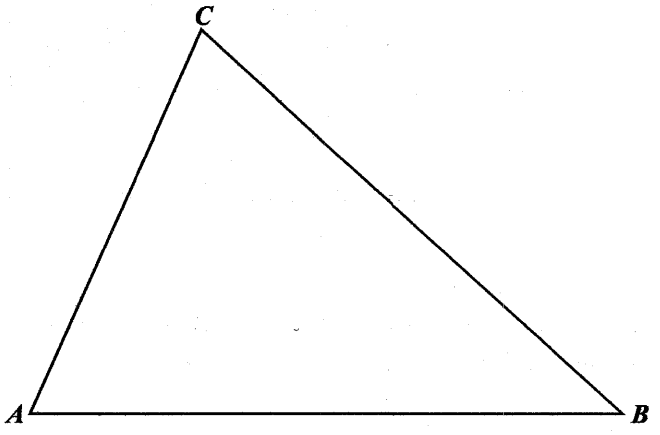
(ii) One of the 120 toys is chosen at random. Determine the probability that this toy is a red truck.

.....

**(1 mark)**

**Total 10 marks**

**2.** Farmer Jay owns a triangular field, $ABC$. A scale diagram of this field is shown below. (1 centimetre represents 10 metres.)




(a) (i) a) Complete the following statement.

The side of the field, $AC$, is _____ metres long.

**(1 mark)**

b) Measure, in degrees, the angle $ACB$.

.....

**(1 mark)**

Construct the responses to Parts (ii) and (iii) on the scaled drawing shown above. Show ALL construction lines.

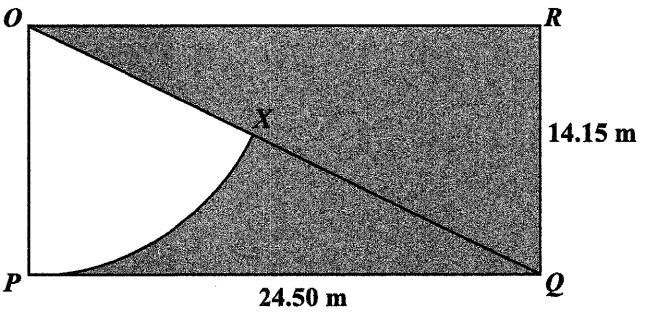
(ii) Farmer Jay divides the field with a fence from $A$ to the side $BC$. Each point on the fence is the same distance from $AB$ as from $AC$.

Using a straight edge and compasses only, construct the line representing the fence. Label the fence $AF$. **(2 marks)**

(iii) Farmer Jay puts another fence along the perpendicular bisector of the side $AC$. He decides to keep cows in the region of the field which is closer to $AC$ than to $AB$ and closer to $A$ than to $C$.

Using a ruler and compasses only, construct the line representing this fence and shade and label as $W$ the region in the field where cows are kept. **(2 marks)**

(b) Farmer Macy has a rectangular garden, *OPQR*, which is shown below.




The length of the garden is 24.50 m and its width is 14.15 m. *OQ* is a diagonal and *OPX* is a sector of a circle, with centre *O*. The unshaded sector represents a pond where Farmer Macy stores water to irrigate her farm. The shaded area is planted with crops.

(i) Determine the value of Angle *POQ*, to the nearest degree.

.....

**(2 marks)**

(ii) Calculate the area of the farmland that is planted with crops.

(Use $\pi = \frac{22}{7}$.)

.....

**(2 marks)**

**Total 10 marks**

**END OF TEST**

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

FORM TP 2024099

TEST CODE **01234032**

MAY/JUNE 2024

**CARIBBEAN EXAMINATIONS COUNCIL**

**CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION**

# MATHEMATICS

**Paper 032 – General Proficiency**

***1 hour***

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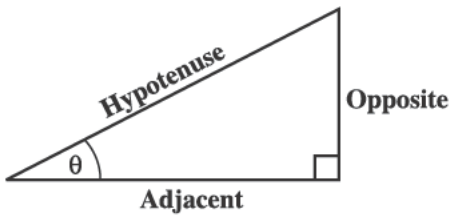
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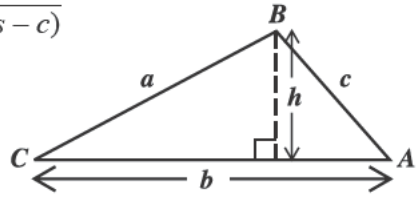



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$$\text{Area of } \Delta ABC = \sqrt{s(s-a)(s-b)(s-c)}$$

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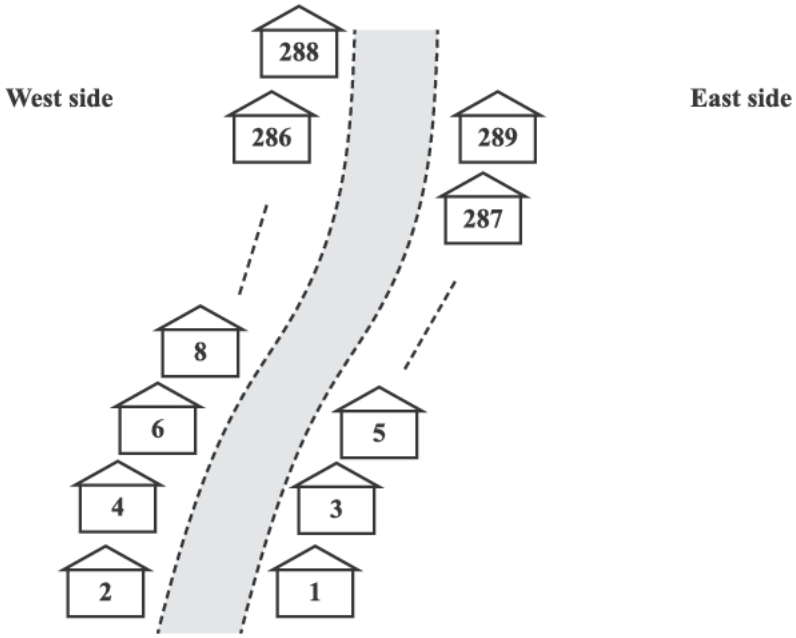
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**1.** Along a road, there are 289 houses numbered 1 to 289. Some of these houses are shown on the diagram below. The houses on the western side of the road have even numbers and the houses on the eastern side have odd numbers.




(a) Circle the house number(s) in the list below that is/are on the eastern side of the road.

50 87 126 178 189 252

**(1 mark)**

(b) Determine the number of` houses on the western side of the road.

.....

**(2 marks)**

GO ON TO THE NEXT PAGE

(c) On the western side, how many houses are there **between** the house numbered 166 and the house numbered 184?

.....

**(1 mark)**

(d) Which of the houses from 1 to 100 have numbers that are **both** a multiple of 29 **and** a composite number?

.....

**(1 mark)**

(e) Hosea delivers a pamphlet to some of the houses on the eastern side of the road. He starts at House number 1 and then delivers to **every other** house, in order.

(i) An expression, in terms of $n$, for the house number of the $n$th house to which Hosea delivers pamphlets is given as $4n + k$. Determine the value of $k$.

.....

**(1 mark)**

(ii) Determine the house number of the 50th house to which he delivers a pamphlet.

.....

**(1 mark)**

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(f) There have been 36 complaints about the garbage collection service along the roadside.

The complaints are as follows.

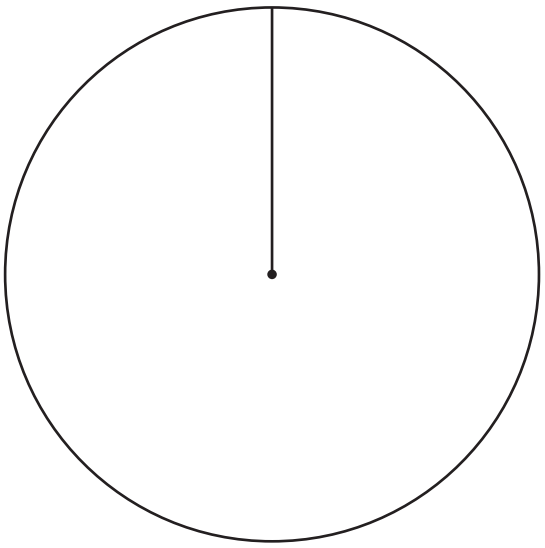
- The price for the service is too high.
- The garbage collectors do not do clean work.
- The garbage truck does not operate on schedule.

(i) Complete the table below.

| Complaint | Frequency | Pie Chart Sector Angle |
|---|---|---|
| Price | 15 | ..... |
| Untidy work | 9 | 90° |
| Off schedule | 12 | ..... |

**(1 mark)**

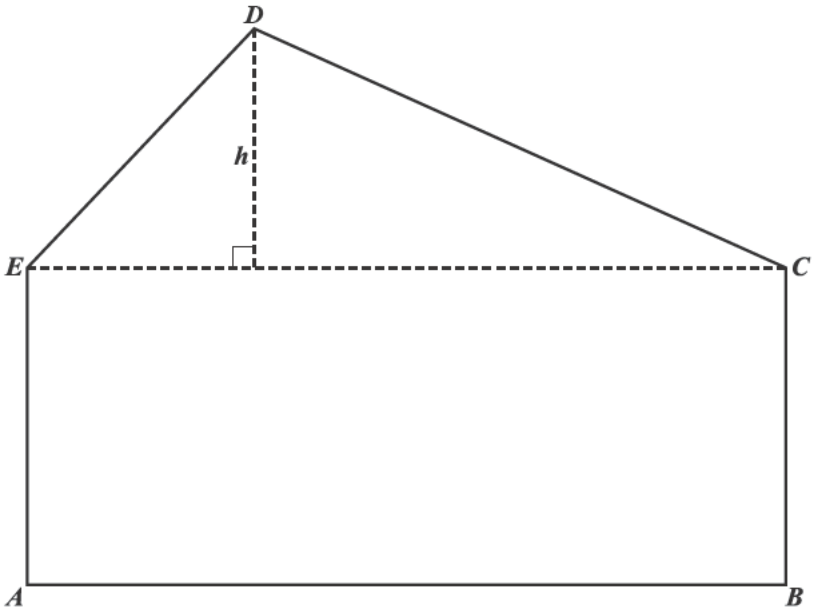
(ii) Complete the pie chart below to show the information in the table.



**(2 marks)**

**Total 10 marks**

**2.** The scale drawing below shows a playfield, *ABCDE*. In the drawing, 1 cm represents 3 m.




(a) Measure the height, *h*, and determine the **actual distance**, in metres.

.....

**(1 mark)**

(b) The section *CDE* of the playfield is a children's playground and must be completely covered with a grass mat to ensure the children's safety.

Calculate the amount of material, ***in square metres***, that is needed to cover the section *CDE*.

.....

**(3 marks)**

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(c) There is a circular pool in the playfield. The pool has a diameter of 36 m.

Calculate, as represented on the scale drawing,

(i) the circumference of the pool

(Use $\pi = \frac{22}{7}$.)

.....

**(2 marks)**

(ii) the area of the pool.

.....

**(2 marks)**

(d) A straight path, *CP*, crosses *AB* at *P*. The path is equidistant from *CB* and *CD*.

**Using a ruler and compasses only**, construct the path on the diagram **on page 8**. **Show all your construction arcs.** **(2 marks)**

**Total 10 marks**

**END OF TEST**

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FORM TP 02025021

TEST CODE **01234032**

JANUARY 2025

**CARIBBEAN EXAMINATIONS COUNCIL**

**CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION**

**MATHEMATICS**

**Paper 032 – General Proficiency**

***1 hour***

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"*"Barcode Area"*"
Sequential Bar Code

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

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

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

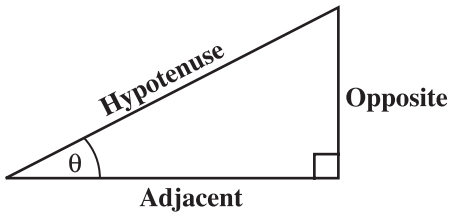
$$\text{then } x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

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.

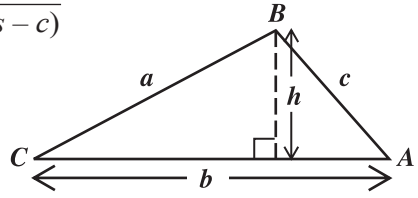
$$\text{Area of } \Delta ABC = \frac{1}{2} ab \sin C$$

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

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

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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Sequential Bar Code

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**1.** Lakram packs tins of milk for sale in large boxes and small boxes. Each large box holds 24 tins and each small box holds 12 tins. He has $x$ large boxes and $y$ small boxes.

(a) Lakram must pack at least 240 tins of milk.

Using the information given above, show that $2x + y \geq 20$.

.....

**(1 mark)**

(b) Lakram must not use more than 18 boxes. He must use at least 6 small boxes. The number of small boxes must be less than or equal to the number of large boxes.

Write down 3 inequalities to represent the information given above.

.....

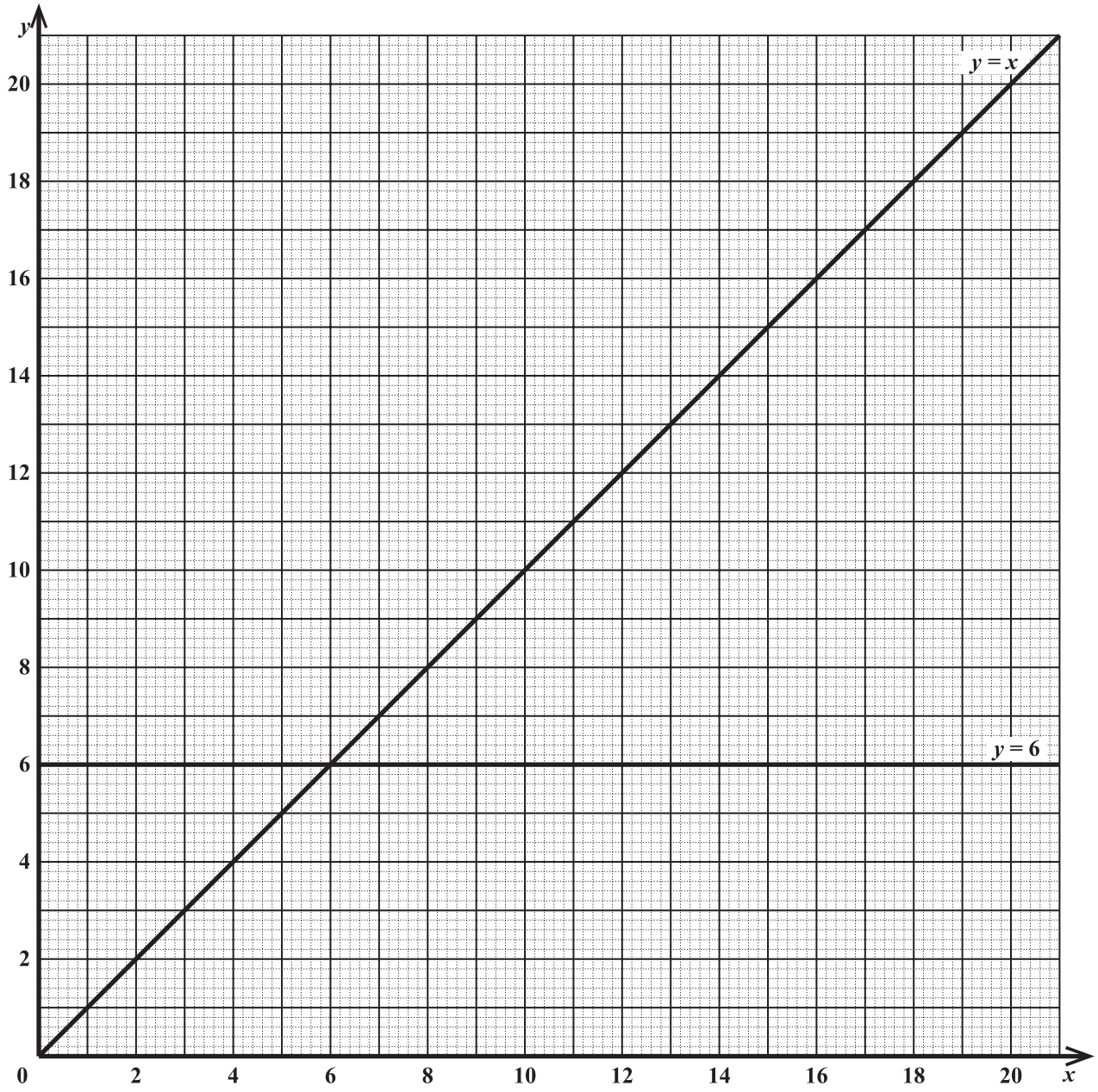
**(3 marks)**

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"*"Barcode Area"*"
Sequential Bar Code

(c) An incomplete graph is shown on the grid below. Using the information given in Parts (a) and (b), complete the graph by drawing the remaining two straight lines associated with the inequalities. Shade the common region that satisfies ALL the inequalities.




**(3 marks)**

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(d) A large box costs \$5 and a small box costs \$2.

(i) Find the number of large boxes and the number of small boxes which would yield the LEAST possible cost.

Number of large boxes .....

Number of small boxes .....

**(2 marks)**

(ii) Determine the LEAST possible total cost of the boxes.

.....

**(1 mark)**

**Total 10 marks**

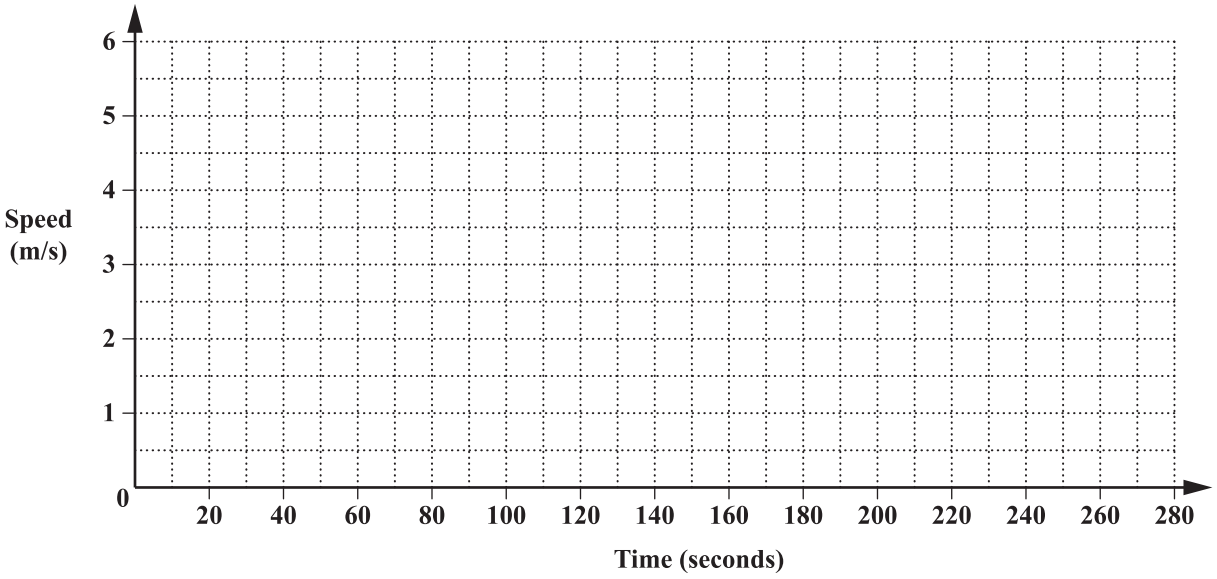


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Sequential Bar Code

**2.** (a) As part of her exercise regime at the Alpha Athletico Club, Kayla cycles along a straight path for $4\frac{1}{2}$ minutes.

She starts from rest and accelerates at a constant rate until she reaches a speed of 6 m/s after 50 seconds. She continues cycling at this top speed of 6 m/s for 3 minutes and 10 seconds. She then decelerates at a constant rate until she stops after a further 30 seconds.

(i) On the grid below, draw a speed–time graph to show Kayla's journey.




**(3 marks)**

(ii) Determine Kayla's acceleration for the first 50 seconds of her journey.

.....

**(1 mark)**



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Sequential Bar Code

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(iii) Calculate Kayla's average speed for the journey.

.....

**(2 marks)**

(b) In a football tournament a team is given 3 points for a win, 1 point for a draw and 0 points for a loss. The table below shows the results for the 24 games that the Alpha Athletico football team played.

| **Points** | 3 | 1 | 0 |
|---|---|---|---|
| **Frequency** | 12 | 7 | 5 |

(i) Find the

a) median of the number of points scored

.....

**(1 mark)**

b) mode of the number of points scored.

.....

**(1 mark)**

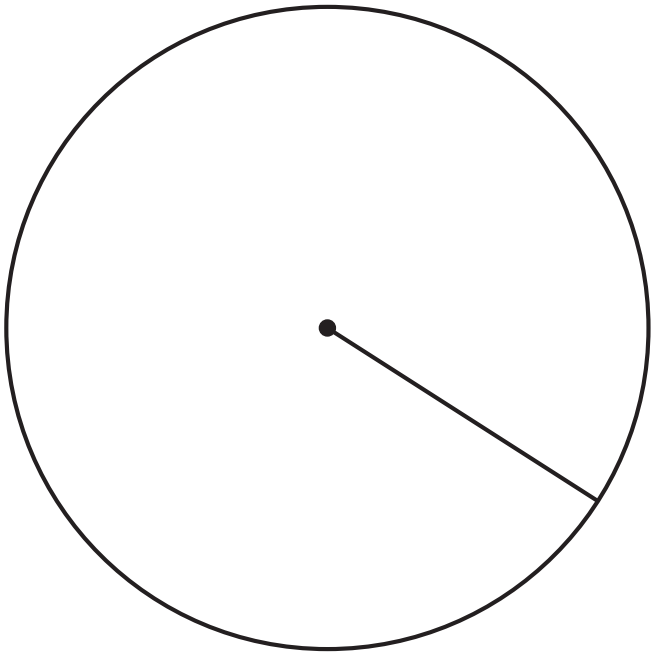
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(ii) Using the information in the table in Part (b) and the template below, draw a pie chart to show the proportion of wins, draws and losses recorded by the Alpha Athletico football team for the 24 games the team played in the tournament.



**(2 marks)**

**Total 10 marks**

**END OF TEST**

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



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FORM TP 02025099

TEST CODE **01234032**

MAY/JUNE 2025

**CARIBBEAN EXAMINATIONS COUNCIL**

**CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION**

**MATHEMATICS**

**Paper 032 – General Proficiency**

**HYBRID**

***1 hour***

**06 MAY 2025 (p.m.)**

**READ THE FOLLOWING INSTRUCTIONS CAREFULLY.**

1. This paper consists of TWO questions. Answer BOTH questions.
2. Write your answers in the booklet provided.
3. 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.
4. Do NOT write in the margins.
5. All working MUST be clearly shown.
6. **Diagrams in this booklet are NOT drawn to scale, unless otherwise stated.**

**Required Examination Materials**

Electronic calculator
Geometry set

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

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**1.** The number of text messages sent in one day by the 50 students of Form 5M are shown below.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 17 | 11 | 2 | 12 | 39 | 0 | 25 | 18 | 4 | 7 |
| 23 | 17 | 19 | 20 | 21 | 0 | 27 | 8 | 19 | 14 |
| 1 | 12 | 22 | 21 | 25 | 13 | 11 | 35 | 15 | 22 |
| 30 | 5 | 13 | 1 | 2 | 4 | 37 | 12 | 6 | 11 |
| 32 | 31 | 24 | 11 | 3 | 18 | 5 | 3 | 15 | 7 |

(a) Complete the cumulative frequency table using the data above. **(3 marks)**

(b) Calculate the mean number of text messages sent by the students of Form 5M for the day. **(2 marks)**

(c) State the modal class of the number of text messages sent. **(1 mark)**

(d) On the grid, **on page 6** of your answer booklet, draw a histogram to represent the data. **(4 marks)**

**Total 10 marks**

**2.** (a) A business agency gives a 60% increase in an investment over 6 years at simple interest. Marc invested \$8 000, compound interest at the same rate. Calculate the total amount he has after 2 years.

[ The final amount, $A$, when principal, $P$, is invested compound interest at rate, $r$, for $n$ number of years is given by $A = P\left(1 + \frac{r}{100}\right)^n$. ]

**(2 marks)**

(b) The following table shows the value of a car at the end of each year, as it depreciates over a six-year period.

| **Age of Car, in Years, ($x$)** | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|
| **Value of Car, in \$, ($y$)** | 18 000 | 16 500 | 15 000 | 13 500 | 12 000 | 10 500 | 9 000 |

(i) Three points in the table above are plotted on the grid **on page 8** of your answer booklet. Plot the remaining FOUR points and draw a straight line to show the relationship between the value of the car and the age of the car (in years). **(3 marks)**

(ii) Calculate the gradient of the straight line. **(2 marks)**

GO ON TO THE NEXT PAGE

(iii) What does the gradient of the straight line indicate? **(1 mark)**

(iv) Write an equation to describe the relationship between the age of the car and the value of the car at the end of each year. **(1 mark)**

(v) What is the meaning of the $y$-intercept of the straight line? **(1 mark)**

**Total 10 marks**

**END OF TEST**

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

FORM TP 2026–021

TEST CODE **01234032**

JANUARY 2026

**CARIBBEAN EXAMINATIONS COUNCIL**

**CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION**

**MATHEMATICS**

**HYBRID**

**Paper 032 – General Proficiency**

***1 hour***

**15 JANUARY 2026 (p.m.)**

**READ THE FOLLOWING INSTRUCTIONS CAREFULLY.**

1. This paper consists of TWO questions. Answer BOTH questions.
2. **All responses MUST be written in the answer booklet provided.**
3. Your responses MUST be written in English.
4. 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. Non-numerical answers MUST be written in English.
5. All working MUST be clearly shown.
6. It is an offence to share your keycode with any other candidate or to log in with another candidate's details.
7. 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

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**LIST OF FORMULAE**

Volume of a prism — $V = Ah$ where $A$ is the area of the 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 $\theta$ is the angle subtended by the arc, measured in degrees.

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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 $ax^2 + bx + c = 0$,

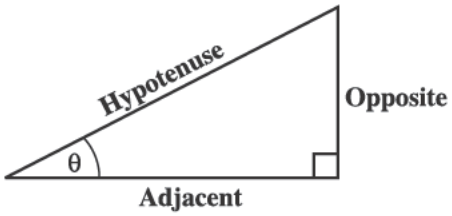
$$\text{then } x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Trigonometric ratios

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

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

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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.

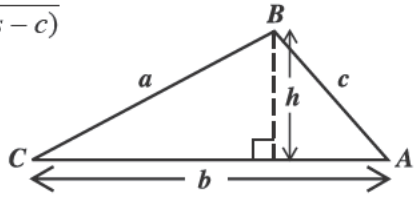
$$\text{Area of } \Delta ABC = \frac{1}{2}ab\sin C$$

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

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

Sine rule

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




Cosine rule

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

GO ON TO THE NEXT PAGE

**1.** Plaxton owns and operates a small business. He does plumbing, mostly in the countryside, out of a well-stocked mobile unit. He does not have a fixed way in which he calculates the cost of a job.

Plaxton's clientele has increased and so he needs to develop a model that he can utilize to quickly determine the cost of a job.

The following information is provided to you.

| **Length of a Job (in hours)** | **Cost ($)** |
|---|---|
| 1 | 130 |
| 2 | 210 |
| 3 | 290 |
| 4 | 370 |
| 5 | 450 |
| 6 | 530 |
| 7 | 610 |

To develop the model, you must answer the following questions based on the information provided.

(a) Plaxton must carry out an inspection for each job and must discuss findings and options with customers before he begins. The inspection cost is fixed and is included in the final payment for a job.

(i) Using the information provided, plot a graph of cost ($C$) versus time ($t$) on the grid shown below, where $t$ represents the time taken, in hours, to complete a job and $C$ represents the total cost of the job, in dollars. **(3 marks)**

(ii) The equation of the line represents the model to be used to calculate the cost of a job.

Determine the equation of the line in the form $y = mx + c$. **(2 marks)**

(iii) Using your graph or otherwise, determine Plaxton's inspection cost. **(1 mark)**

(b) Plaxton received $490 for a job. Determine the number of hours he spent on this job. **(1 mark)**

(c) Plaxton and Leela are now working jointly and they must settle on a common model to be used to calculate the cost of a job. Leela charges $50 for inspections and $90 per hour to do a job but, unlike Plaxton, she refunds the inspection cost to the customer once the job is given to her. Plaxton wants to compare the 2 models.

(i) Using the same pair of axes **on page 5 of the answer booklet**, draw the line representing Leela's model, assuming that she is given **all** the jobs that she inspects. **(2 marks)**

(ii) Determine how long a job that returns the same cost for BOTH Plaxton's model and Leela's model would take. **(1 mark)**

**Total 10 marks**

**2.** Ella wanted to determine the characteristics of a great teacher that are important to a group of 30 fifth form students at her school. She asked the students to rate the importance of each of the following 5 criteria using a scale of 1 to 10, with 10 representing a characteristic that is **most** important and 1 representing a characteristic that is **least** important.

- Entertaining
- Communicative
- Knowledgeable
- Caring
- Easy-going

The students' ratings for Entertaining are shown below.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 8 | 8 | 8 | 7 | 7 | 7 | 8 | 8 | 8 |
| 8 | 8 | 8 | 10 | 7 | 7 | 8 | 8 | 8 | 7 |
| 8 | 7 | 8 | 9 | 9 | 9 | 8 | 9 | 8 | 8 |

You are required to write a description of how the investigation would have been conducted by using the headings provided and answering the questions that follow.

(a) State the data collection method that Ella MOST likely used for this investigation. **(1 mark)**

(b) (i) Determine the range of the ratings for the data recorded above. **(1 mark)**

(ii) Complete the tally and frequency columns in the table below.

| Rating | Tally | Frequency (*f*) |
|---|---|---|
| 7 | | |
| 8 | 𝍸 𝍸 𝍸 \| | 18 |
| 9 | | |
| 10 | \| | 1 |

**(2 marks)**

(iii) Using the table above, determine for the 30 students on the "Entertaining" attribute of their teacher, the

a) median rating **(1 mark)**

b) average rating. **(2 marks)**

(c) The table below shows some statistics for the 5 characteristics under consideration. Most of the statistics for Entertaining are missing.

| Statistics | Entertaining | Communicative | Knowledgeable | Caring | Easy-going |
|---|---|---|---|---|---|
| Minimum rating | | 1 | 2 | 4 | 3 |
| Maximum rating | | 6 | 7 | 9 | 8 |
| Mean/average | | 3.30 | 3.63 | 6.97 | 6.97 |
| Standard deviation | 0.72 | 1.44 | 1.36 | 1.23 | 1.01 |

Fill in the missing information in the table above. Use the data in your finalized table to complete the sample analysis and interpretation of data shown below.

**Analysis and Interpretation of Data**

In order of importance to the students, the 5 characteristics are ranked from 1 to 5, with 1 being the MOST important and 5 being the LEAST important. Given that Easy-going is ranked number 2 and Knowledgeable is ranked number 4, rank the remaining 3 qualities.

(1)

(2) Easy-going

(3)

(4) Knowledgeable

(5)

**(3 marks)**

**Total 10 marks**

**END OF TEST**

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

FORM TP 2026-099

TEST CODE **01234032**

MAY–JUNE 2026

# CARIBBEAN EXAMINATIONS COUNCIL

## CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION

## MATHEMATICS

### Paper 032 – General Proficiency

*1 hour*

**READ THE FOLLOWING INSTRUCTIONS CAREFULLY.**

1. This paper consists of TWO questions. Answer BOTH questions.
2. Write your answers in the spaces provided in this booklet.
3. 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.
4. Do NOT write in the margins.
5. All working MUST be clearly shown.
6. **A list of formulae is provided on page 4 of this booklet.**
7. If you need to rewrite any answer and there is not enough space to do so on the original page, you must use the extra page(s) provided at the back of this booklet. **Remember to draw a line through your original answer.**
8. **If you use the extra page(s), you MUST write the question number clearly in the box provided at the top of the extra page(s) and, where relevant, include the question part beside the answer.**
9. **Diagrams in this booklet are NOT drawn to scale, unless otherwise stated.**

**Required Examination Materials**

Electronic calculator
Geometry set

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## LIST OF FORMULAE

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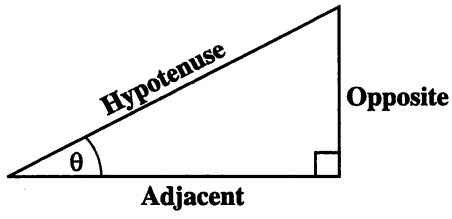
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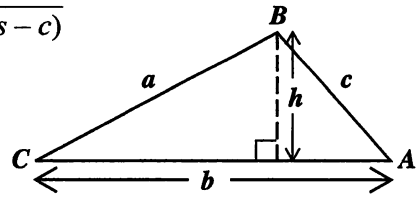



Area of a triangle — Area of $\Delta = \frac{1}{2}bh$ where $b$ is the length of the base and $h$ is the perpendicular height.

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

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

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




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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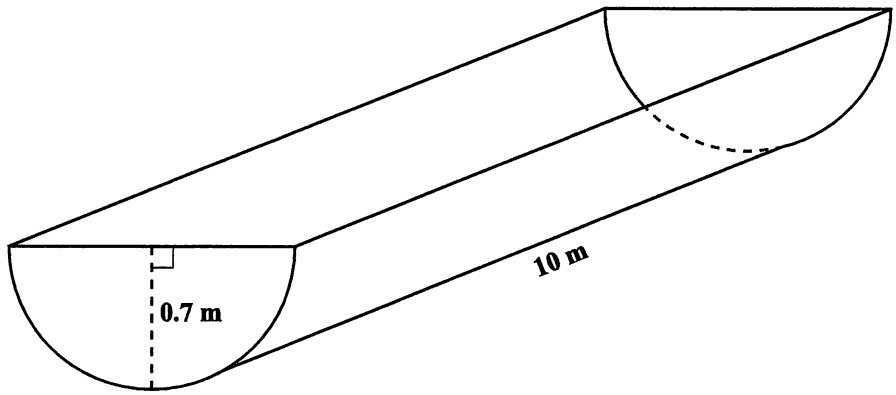


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**1.** The diagram below shows a horizontal, semicylindrical-shaped trough with a uniform semicircular cross-section, which Farmer Brown wants to use to feed his cows. The radius of the semicircle is 0.7 m and the length of the trough is 10 m.

(Use $\pi = \frac{22}{7}$.)




(a) Show that the capacity of the trough is 7 700 cubic metres.

.....

**(2 marks)**

(b) Farmer Brown is setting up a cattle farm comprising cows for milk production (dairy cattle) and cows for beef production (beef cattle), and needs advice on the number of EACH type of cattle he MUST buy to maximize production.

The average daily water consumption is 70 litres and 35 litres for dairy cattle and beef cattle respectively.

To supply his cattle with water, Farmer Brown must use only ONE trough, as shown in (a) **on page 5**.

Using $x$ to represent the number of dairy cattle and $y$ to represent the number of beef cattle,

(i) show that $2x + y \leq 220$.

.....

**(2 marks)**

Farmer Brown can have no more than 160 cattle.

(ii) Write an inequality in $x$ and $y$ to represent this constraint.

.....

**(1 mark)**

Further, there **must** be AT LEAST 40 dairy cattle and the number of beef cattle must be GREATER than 60 but NOT exceed 3 times the number of dairy cattle.

(iii) In addition to the inequalities $x \geq 40$ and $y > 60$, write the third inequality to represent the constraints above.

.....

**(1 mark)**

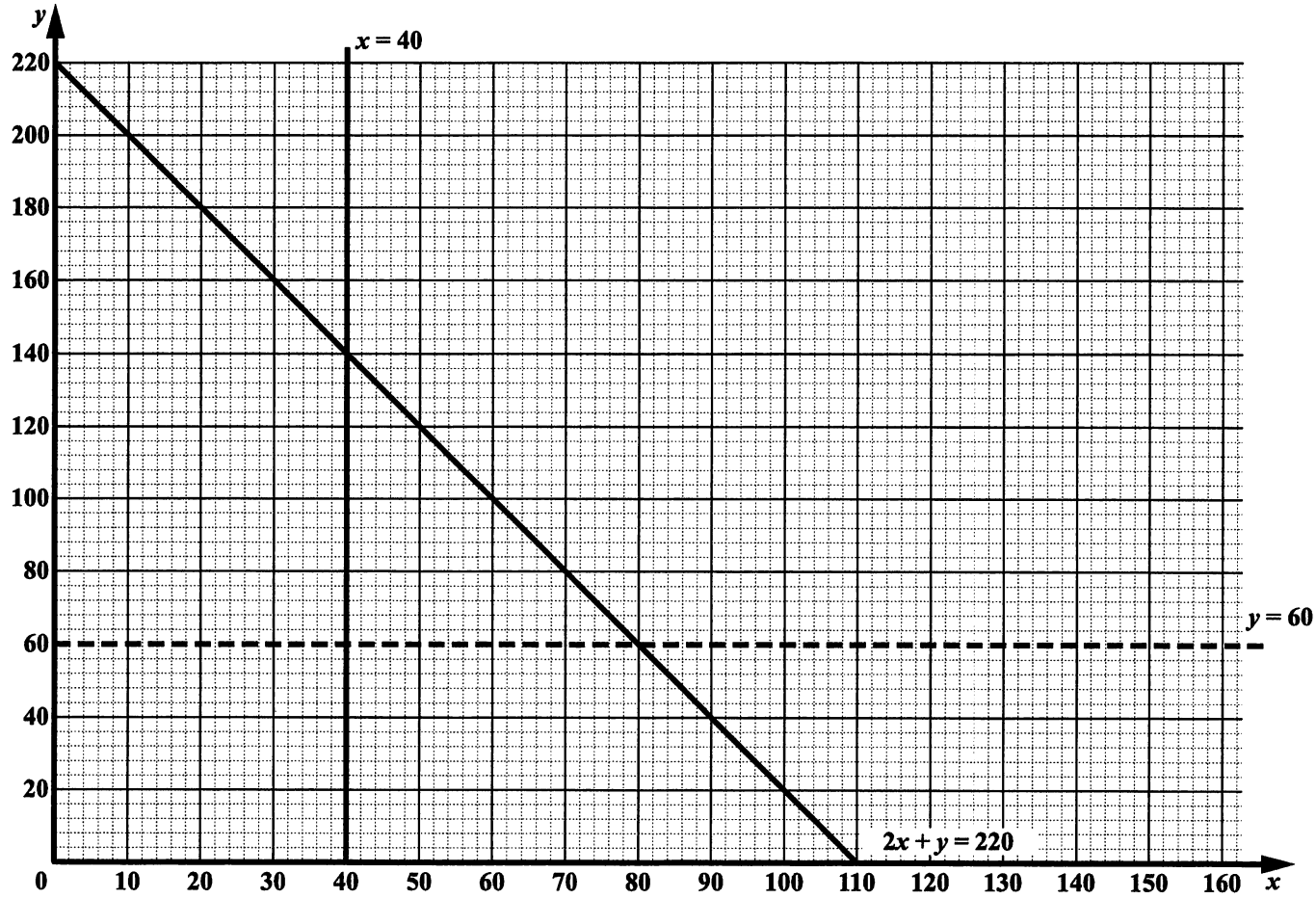
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(iv) On the graph below, the lines associated with 3 of the inequalities are shown. The lines associated with 2 of the inequalities are missing.




a) On the graph, construct the lines associated with the inequalities you wrote in (b) (ii) and (iii) **on page 6**. **(2 marks)**

b) Shade, and label as *R*, the common region for all 5 inequalities represented on the graph. **(1 mark)**

(v) Based on the graph, suggest ONE of the possible combinations of the two types of cattle that Farmer Brown can use to set up his farm.

.....

**(1 mark)**

**Total 10 marks**

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**NOTHING HAS BEEN OMITTED.**

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**2.** The Triple S Cable Company is tracking the number of daily service desk calls it receives, in order to improve operational efficiency. At the end of each month, the data is collected, graphed and compared with previous months, to identify trends in fault reports and to develop improvement plans for the following month.

The following data set shows the number of calls received daily during the month of November.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 11 | 3 | 6 | 22 | 21 | 15 | 11 | 22 | 49 | 19 |
| 21 | 11 | 11 | 21 | 13 | 11 | 32 | 35 | 16 | 36 |
| 9 | 3 | 41 | 45 | 22 | 15 | 21 | 22 | 10 | 32 |

You are required to answer the following questions which will provide details for the November report.

(a) (i) Complete the tally and frequency columns in the table below to represent the given information.

| **Daily Number of Calls Received** | **Tally** | **Frequency (*f*)** |
|---|---|---|
| 1–10 | 𝍸 | 5 |
| 11–20 | ..... | ..... |
| 21–30 | ..... | ..... |
| 31–40 | 𝍸 | 4 |
| 41–50 | 𝍸 | 3 |

**(2 marks)**

GO ON TO THE NEXT PAGE

(ii) The table below shows the midpoints for the classes defined in (a) (i) **on page 9**.

| **Daily Number of Calls Received** | **Midpoint ($x$)** | **Frequency ($f$)** | **Frequency × Midpoint ($fx$)** |
|---|---|---|---|
| 1–10 | 5.5 | 5 | 27.5 |
| 11–20 | 15.5 | ..... | ..... |
| 21–30 | 25.5 | ..... | ..... |
| 31–40 | 35.5 | 4 | 142 |
| 41–50 | 45.5 | 3 | 136.5 |

Complete the table above and use the information to estimate the average number of calls received per day over the 30 days.

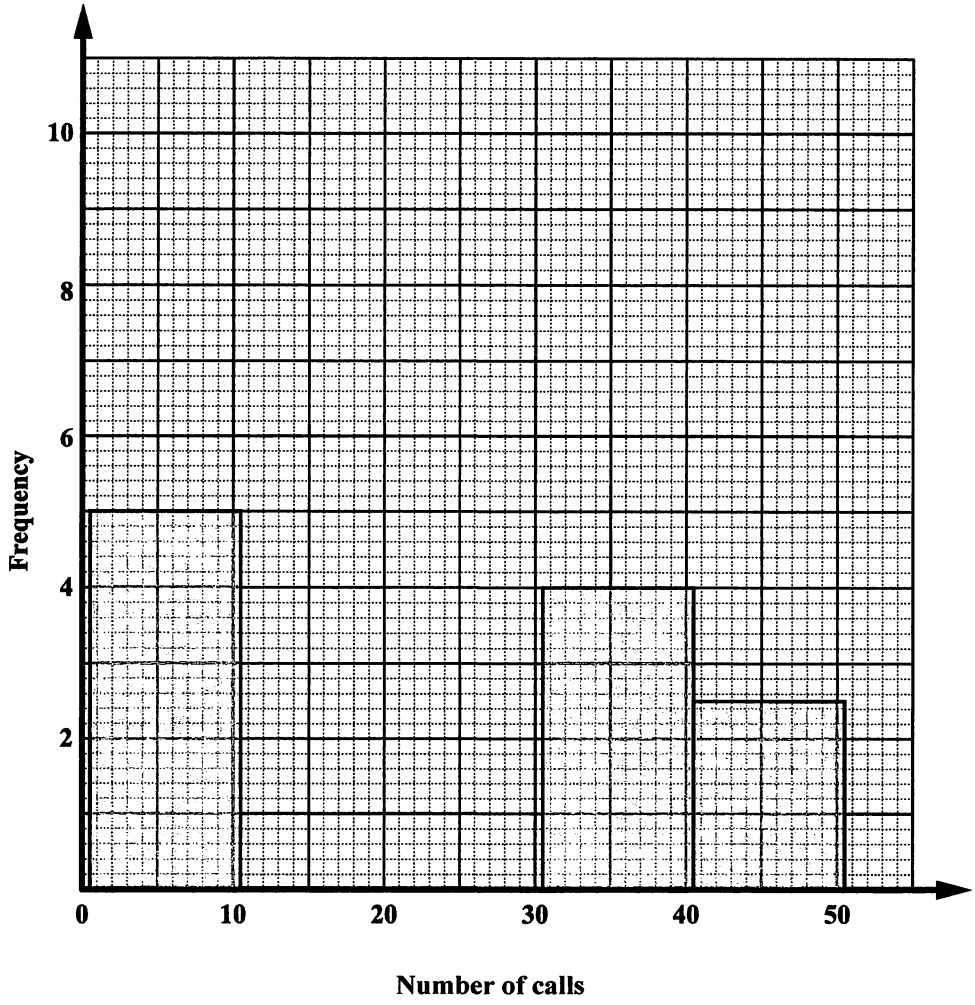
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**(2 marks)**



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(b) Complete the histogram below to graphically represent the data given **on page 9**.




**(2 marks)**

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(c) The table below shows the standard deviation for the number of daily calls received for the month of November and the average monthly statistics for the months preceding it.

| Statistics | November | Preceding Months |
|---|---|---|
| Minimum | | 14 |
| Maximum | | 57 |
| Mean | | 26.5 |
| Median | | 25.5 |
| Mode | | 15 |
| Standard deviation | 11.85 | 16.93 |

Complete the table by filling in the missing information for November. **(3 marks)**

(d) Use your calculated value of the mean and the given value of the standard deviation to explain why the fault reporting situation at the cable company had improved in November, relative to the preceding months.

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**(1 mark)**

**Total 10 marks**

**END OF TEST**

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



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