FORM TP 2023047

TEST CODE 01254032

MAY/JUNE 2023

CARIBBEAN EXAMINATIONS COUNCIL

CARIBBEAN SECONDARY EDUCATION CERTIFICATE®
EXAMINATION

ADDITIONAL MATHEMATICS

Paper 032 – General Proficiency

ALTERNATIVE TO SCHOOL-BASED ASSESSMENT

1 hour 30 minutes

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

1. This paper consists of ONE compulsory question.
2. Write your answers in the spaces provided in this booklet.
3. Do NOT write in the margins.
4. A list of formulae is provided on page 4 of this booklet.
5. 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.**
6. **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.**

Required Examination Materials

Electronic calculator (non-programmable)
Geometry set

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

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LIST OF FORMULAE

Arithmetic Series $T_n = a + (n-1)d \qquad S_2 = \frac{n}{2}[2a + (n-1)d]$

Geometric Series $T_n = ar^{n-1} \qquad S_n = \frac{a(r^n - 1)}{r-1} \qquad S_\infty = \frac{a}{1-r}, -1 < r < 1 \text{ or } |r| < 1$

Circle $x^2 + y^2 + 2fx + 2gy + c = 0 \qquad (x+f)^2 + (y+g)^2 = r^2$

Vectors $\hat{\mathbf{v}} = \frac{\mathbf{v}}{|\mathbf{v}|} \qquad \cos\theta = \frac{\mathbf{a} \bullet \mathbf{b}}{|\mathbf{a}| \bullet |\mathbf{b}|} \qquad |\mathbf{v}| = \sqrt{(x^2 + y^2)}$ where $\mathbf{v} = x\mathbf{i} + y\mathbf{j}$

Trigonometry

$\sin(A \pm B) \equiv \sin A \cos B \pm \cos A \sin B$

$\cos(A \pm B) \equiv \cos A \cos B \mp \sin A \sin B$

$\tan(A \pm B) \equiv \frac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$

Kinematics $v = u + at \qquad v^2 = u^2 + 2as \qquad s = ut + \frac{1}{2}at^2 \qquad v = \frac{dx}{dt} = \dot{x}$

$a = \frac{d^2x}{dt^2} = \frac{dv}{dt} = \ddot{x}$

Calculus $\frac{d}{dx}(ax+b)^n = an(ax+b)^{n-1} \qquad \frac{d}{dx}\sin ax = a\cos ax$

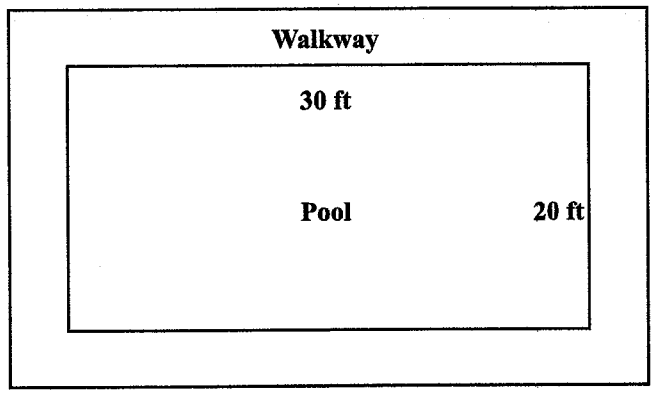
$\frac{d}{dx}\cos ax = -a\sin ax \qquad s = \int v\,dt \qquad v = \int a\,dt$

Statistics $\bar{x} = \frac{\sum_{i=1}^{n} x_i}{n} = \frac{\sum_{i=1}^{n} f_i x_i}{\sum_{i=1}^{n} f_i}, \qquad S^2 = \frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n} = \frac{\sum_{i=1}^{n} f_i x_i^2}{\sum_{i=1}^{n} f_i} - (\bar{x})^2$

Probability $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

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1. John has a swimming pool that is 30 feet by 20 feet. He wants to have a tiled walkway of uniform width around the edge of the pool.



(a) If 336 square feet of tiles are needed to cover the walkway, what is the width of the walkway?

(10 marks)

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(b) The gradient function $\frac{dy}{dx}$ of a curve, y, is given by $x^2 + \frac{1}{5}$. A tangent to the curve at $x = -2$ intercepts the y-axis at $\frac{13}{3}$. Determine the equation of the curve y.

(10 marks)

(c) Table 1 shows the types of movies that 250 randomly selected students preferred to watch during the summer vacation.

TABLE 1: STUDENTS' PREFERENCES OF SCIENCE FICTION OR COMEDY MOVIES

	Prefers Watching Science Fiction (S)	**Prefers Watching Comedy (C)**	**Total**
Male (M)	95	25	
Female (F)	45	85	
Total			

(i) If one student is selected at random from this group, find the probabilities

P(S)

P(M)

P(F and C).

(3 marks)

(ii) If one student is randomly selected from this group, find the probability that this student prefers watching science fiction movies or is a male student.

(2 marks)

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(iii) Determine whether the events 'prefers watching science fiction' and 'female' are independent. Justify your response.

(3 marks)

(iv) Determine if the events 'prefers watching comedy movies' and 'male' are mutually exclusive. Justify your response.

(2 marks)

Total 30 marks

END OF TEST

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