

B G C S E

MATHEMATICS

EXAMINATION PAPERS

UNDERSTAND • PRACTICE • SUCCEED





THE OPENHANDED CLASSROOM

LEARN MORE. ACHIEVE MORE. SMILE MORE.



BGCSE CLASSES

- ✓ Exam-Focused Learning
- ✓ Past Papers & Strategies
- ✓ Stronger Understanding
- ✓ Better Grades, Brighter Future



[**CLICK HERE**](#)



SAT CLASSES

- ✓ Smart Test Strategies
- ✓ Stronger Scores
- ✓ Time Management Skills
- ✓ College & Scholarship Ready



[**CLICK HERE**](#)



BJC CLASSES

- ✓ Clear, Simple Explanations
- ✓ Focus on Understanding
- ✓ Help That Fits Your Pace
- ✓ Build Confidence, Get Results



[**CLICK HERE**](#)



EXPERT TEACHING.
PROVEN RESULTS.



LEARN SMARTER.
ACHIEVE MORE.



FOCUSED SUPPORT.
REAL RESULTS.



THEOPENHANDEDCLASSROOM:
(242) 426-8891



THE OPENHANDED CLASSROOM

BGCSE FREE SOLUTIONS MANUALS

COMPLETE SOLUTIONS FOR ALL
MAJOR SUBJECTS

- ⦿ MATHEMATICS
- ⦿ ENGLISH LANGUAGE
- ⦿ HISTORY
- ⦿ RELIGIOUS STUDIES
- ⦿ ACCOUNTS
- ⦿ SCIENCES (BIOLOGY, PHYSICS,
COMBINED SCIENCE)
- ⦿ FOREIGN LANGUAGE
(FRENCH AND SPANISH)

UNDERSTAND. PRACTICE. SUCCEED.

[CLICK HERE](#)

EXAM-REAL.

EXAM-PROVEN.

FREE LISTENING COMPREHENSION — AUDIO FILES —



THE **EXACT AUDIO** USED
IN PAST BJC & BGCSE EXAMS



REAL EXAMS

The exact listening comprehension audio from past papers.



REAL PREPARATION

Hear what you'll hear in the real exam.



REAL RESULTS

Practise with purpose. Improve your confidence and performance.

AVAILABLE FOR:



BJC
ENGLISH



BGCSE
ENGLISH LANGUAGE



BJC
FRENCH



BJC
SPANISH



BGCSE
FRENCH



BGCSE
SPANISH

WHY THESE AUDIO FILES MATTER



EXACT AUDIO

The exact recordings used in past BJC & BGCSE exams.



EXAM FAMILIARITY

Get used to the real voices, speed, accents and exam conditions.



STRATEGIC ADVANTAGE

Walk in confident knowing exactly what to expect.



100% FREE

High quality. No cost. Just results.



CLICK HERE

DOWNLOAD • START PRACTISING



BETTER PREPARATION.
BETTER RESULTS.

You've got this!

PAST EXAMS. **REAL AUDIO**. BETTER PREP. GREATER CONFIDENCE.

MATHEMATICS

PAPER 3 (CORE/EXTENDED) 3815/3

Wednesday **24 MAY 2023** 9:00 A.M.–11:30 A.M.

Additional materials:

Calculator (not graphing)

Answer booklet

Geometrical instruments

Graph paper

MINISTRY OF EDUCATION NATIONAL EXAMINATIONS

BAHAMAS GENERAL CERTIFICATE OF SECONDARY EDUCATION

INSTRUCTIONS TO CANDIDATES

Do not open this booklet until you are told to do so.

Remove the graph paper from the question paper. Close the question paper.

Write your School Number, Candidate Number, Surname and Initials in the spaces provided on the answer booklet **AND** the graph paper. **Place the graph paper in the answer booklet.**

Answer **ALL** questions in the answer booklet.

ALL working must be shown.

ALL working must be done in blue or black ink, except for drawings, lines and constructions which may be done in pencil.

INFORMATION FOR CANDIDATES

Calculators may be used. **[NO GRAPHING CALCULATORS ALLOWED].**

Tracing paper and geometrical instruments may be used.

The mark for each question, or part question, is shown in brackets [].

The total number of marks for this paper is 100.

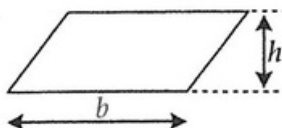


This question paper consists of 10 printed pages and 2 blank pages.

INFORMATION AND FORMULAE

MENSURATION

Parallelogram



$$\text{Area} = bh$$

Circle (radius r , diameter d)

Cylinder (radius r , height h)

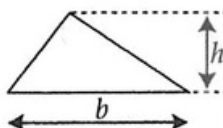
Sphere (radius r)

Prism

Pyramid

Cone (radius r , height h)

Triangle



$$\text{Area} = \frac{1}{2}bh$$

Circumference

Area

Volume

Area of curved surface

Volume

Area of surface

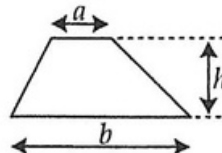
Volume

Volume

Volume

Area of curved surface

Trapezium



$$\text{Area} = \frac{1}{2}(a+b)h$$

$$= 2\pi r \text{ or } \pi d$$

$$= \pi r^2$$

$$= \pi r^2 h$$

$$= 2\pi r h$$

$$= \frac{4}{3}\pi r^3$$

$$= 4\pi r^2$$

$$= \text{area of cross-section} \times \text{length}$$

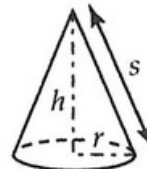
$$= \frac{1}{3} \times \text{area of base} \times \text{height}$$

$$= \frac{1}{3}\pi r^2 h$$

$$= \pi r s$$

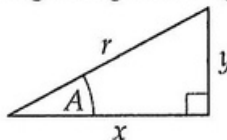
$$\text{where } s = \text{slant height } \sqrt{h^2 + r^2}$$

Cone

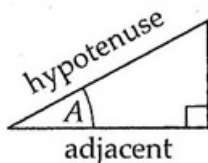


TRIGONOMETRY

Right-angled triangle



$$r^2 = x^2 + y^2 \text{ (result of Pythagoras)}$$

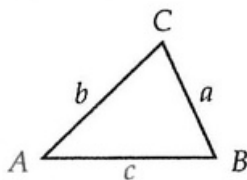


opposite

$$\sin A = \frac{\text{opposite}}{\text{hypotenuse}}, \cos A = \frac{\text{adjacent}}{\text{hypotenuse}}, \tan A = \frac{\text{opposite}}{\text{adjacent}}$$

adjacent

Any triangle



$$\begin{aligned} \text{In any triangle ABC: } \frac{a}{\sin A} &= \frac{b}{\sin B} = \frac{c}{\sin C} \\ a^2 &= b^2 + c^2 - 2bc \cos A \\ \cos A &= \frac{b^2 + c^2 - a^2}{2bc} \end{aligned}$$

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

NUMBER ALGEBRA

Standard form is $a \times 10^n$ where $1 \leq a < 10$ and n is an integer.
The quadratic equation $ax^2 + bx + c = 0$ has solutions

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

The determinant of matrix $\begin{pmatrix} a & b \\ c & d \end{pmatrix}$ is $ad - bc$.

The inverse of $\begin{pmatrix} a & b \\ c & d \end{pmatrix}$ is $\frac{1}{ad - bc} \begin{pmatrix} d & -b \\ -c & a \end{pmatrix}$

If $y = ax^n$, then $\frac{dy}{dx} = anx^{n-1}$



1. During a storm 18 of the boats in the harbour were damaged.

This represents 12% of the boats that were in the harbour.

Find the number of boats that were in the harbour.

[2]

2. x is directly proportional to t^2 .

Given that $t = 2$ when $x = 19.6$, find the value of

(a) x when $t = 3$,

[3]

(b) t when $x = 176.4$.

[3]

3. Matrix A is defined as $A = \begin{pmatrix} 4 & 6 \\ 3 & 5 \end{pmatrix}$.

Find the following.

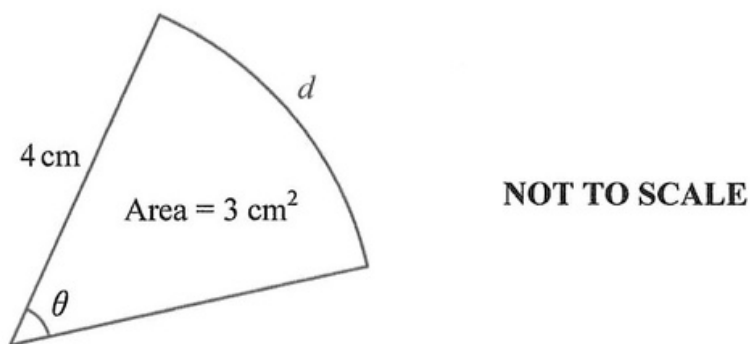
(a) A^2

[3]

(b) A^{-1}

[3]

4.



The diagram above shows a sector of radius 4 cm and area 3 cm².

Using $\pi = 3.14$:

(a) Show that angle θ of the sector is equal to 21.5°.

[3]

(b) Find arc length d .

[2]

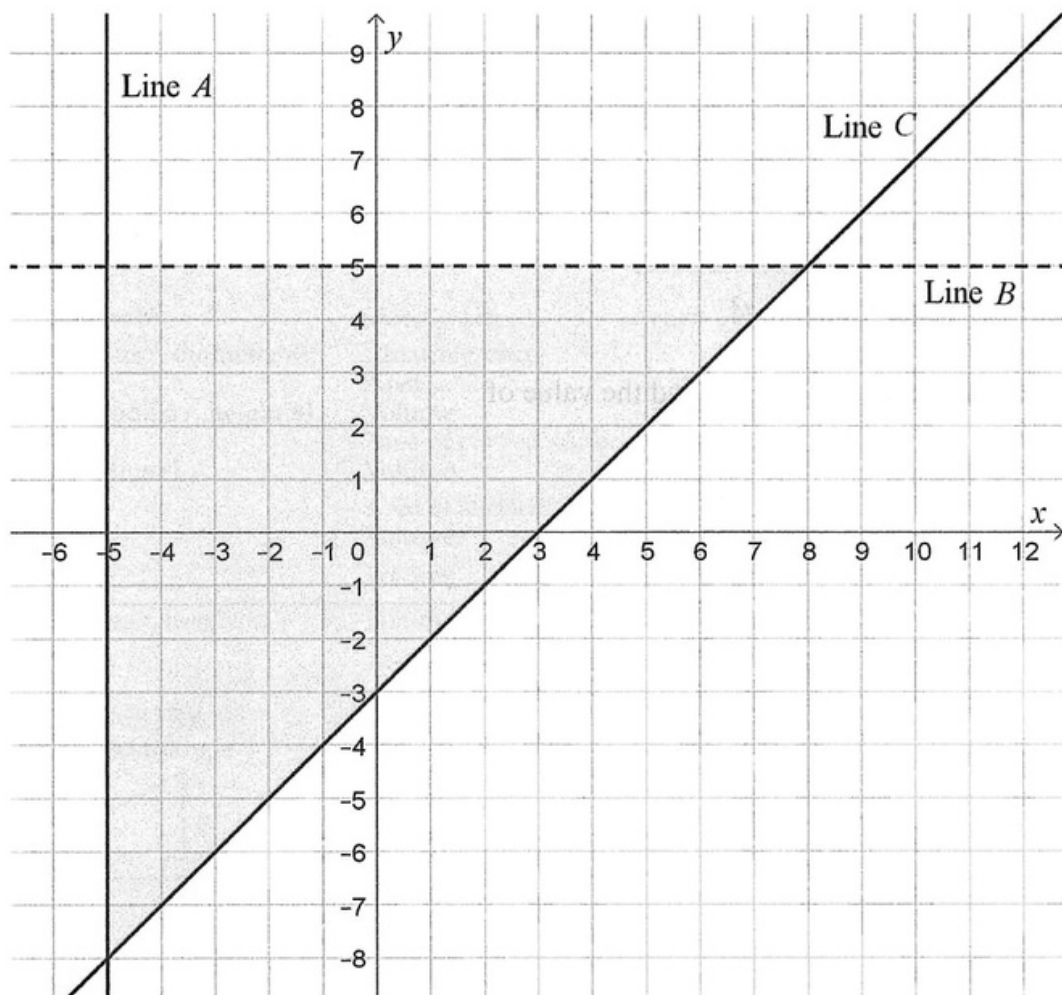
5. Expand and solve the quadratic equation, correct to 2 decimal places.

$$2x(x - 6) = 17$$

[6]

[Turn over

6.



- (a) From the diagram above, write an equation for
- (i) Line A, [1]
 - (ii) Line B, [1]
 - (iii) Line C. [2]
- (b) State the three inequalities that together describe the shaded region above. [3]

7.

- (a) Factorise.
- (i) $12x^3 - 75x$ [3]
 - (ii) $3ay - by - 6a + 2b$ [3]
- (b) Factorise and simplify.
- $$\frac{2x - 3}{2x^2 + 5x - 12}$$
- [3]

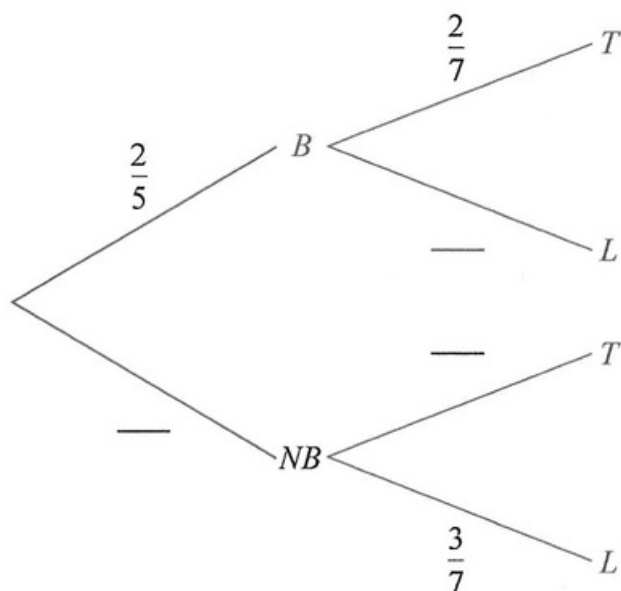


8. The probability Adrian has breakfast (B) is $\frac{2}{5}$.

If he has breakfast, the probability that he arrives at work in time (T) is $\frac{2}{7}$.

If he does not have breakfast (NB), the probability that he arrives at work late (L) is $\frac{3}{7}$.

- (a) Copy and complete the tree diagram below using the above information. [3]



- (b) Find the probability that Adrian
- (i) has breakfast and arrives at work in time, [2]
- (ii) arrives at work late. [3]
-

9. A group of 110 students of Grade 12 were asked which sports they played. The results are below.

$F = \{ \text{students who play football} \}$

$B = \{ \text{students who play basketball} \}$

$S = \{ \text{students who play softball} \}$

14 students play football only.

11 students play softball only.

15 students play football and basketball only.

21 students play all three sports.

13 students play none of these sports.

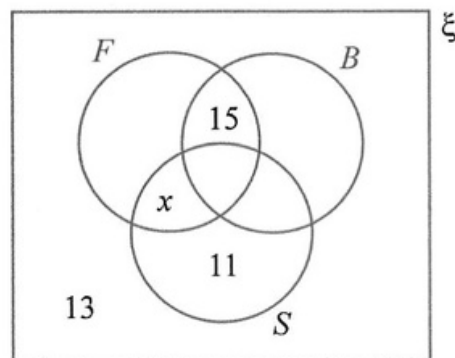
x students play football and softball only.

$2x$ students play basketball and softball only.

$3x$ students play basketball only.

- (a) Copy and complete the Venn diagram using the above information.

[4]



- (b) Form an equation and solve it to find the value of x .

[2]

- (c) Find

- (i) the number of students who play basketball,

[1]

- (ii) $n(B \cap S)$,

[1]

- (iii) $n(F')$,

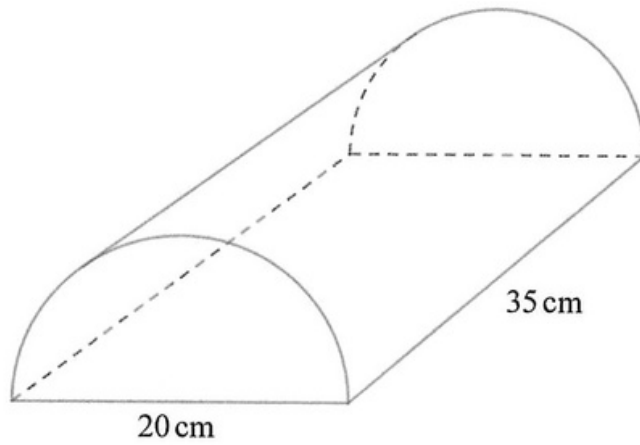
[1]

- (iv) $n[S' \cap (F \cup B)]$.

[1]



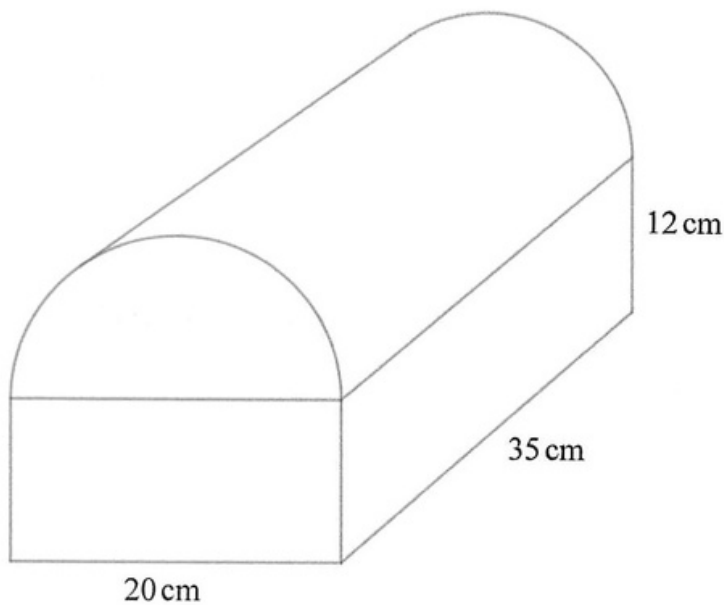
10.



The diagram shows a solid half-cylinder of diameter of 20 cm and length 35 cm.

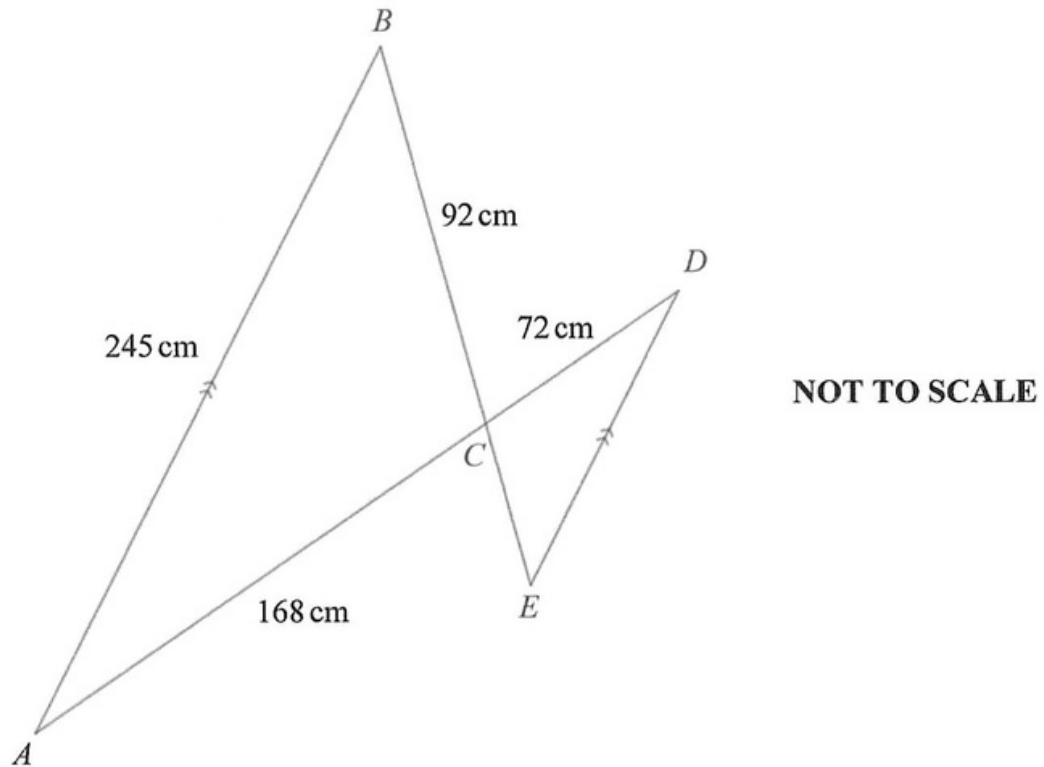
- (a) Calculate the total surface area of the half-cylinder. [5]

The half-cylinder is glued to a cuboid of length 35 cm, width 20 cm and height 12 cm as shown below.



- (b) Calculate the total volume of the solid formed. [4]

11.



AB is parallel to ED , $AB = 245$ cm, $AC = 168$ cm, $BC = 92$ cm, and $CD = 72$ cm.

- (a) Find the size of angle ACB . [4]
- (b) Find the area of triangle ABC . [2]
- (c) State, in the correct order, the triangle that is similar to triangle ABC . [1]
- (d) Hence or otherwise, find length DE . [2]

12. The functions f and g are defined as follows.

$f: x \rightarrow \text{"the smallest prime number that is greater than } x\text{"}$.

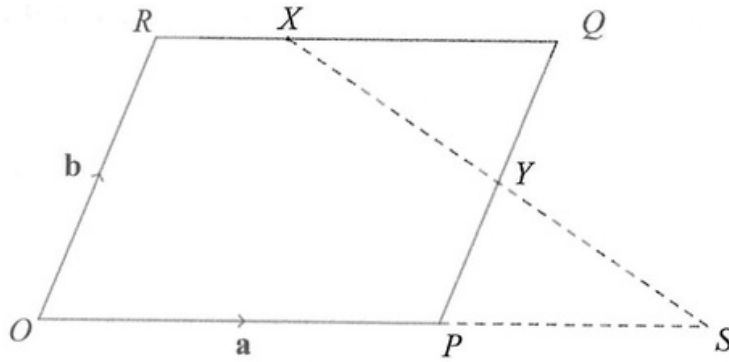
$$g: x \rightarrow \frac{x+1}{3}$$

Find

- (a) $f(20)$, [1]
- (b) $g(20)$, [1]
- (c) $fg(17)$, [2]
- (d) $g^{-1}(x)$. [2]



13.



NOT TO SCALE

In the diagram, $OPQR$ is a parallelogram.

$$RX = \frac{1}{3}XQ$$

Y is the midpoint of PQ .

$$\overrightarrow{OP} = \mathbf{a} \text{ and } \overrightarrow{OR} = \mathbf{b}.$$

(a) Find in terms of $\mathbf{a}$ and $\mathbf{b}$:

(i) $\overrightarrow{PR}$ [1]

(ii) $\overrightarrow{OQ}$ [1]

(iii) $\overrightarrow{XY}$ [2]

XY produced meets OP produced at S such that $PS = XQ$.

(b) Write a simplified expression for $\overrightarrow{XS}$ in terms of $\mathbf{a}$ and $\mathbf{b}$. [2]

14. **ANSWER THIS ENTIRE QUESTION ON THE GRAPH PAPER PROVIDED**

- (a) Find a and b in the table below for $y = 1 + 5x - 2x^2$. [2]

x	–1	–0.5	0	0.5	1	1.5	2	2.5	3	3.5
y	–6	–2	a	3	4	4	3	1	b	–6

- (b) Using a scale of 2 cm to 1 unit on the x -axis for $-2 \leq x \leq 4$ and 1 cm to 1 unit on the y -axis for $-7 \leq y \leq 7$, draw and label the graph of $y = 1 + 5x - 2x^2$. [3]
- (c) Use your graph to solve the equation $-3 = 1 + 5x - 2x^2$. [2]
- (d) Find the gradient of the tangent to the curve $y = 1 + 5x - 2x^2$ at the point (1, 4). [2]
- (e) Draw the tangent to the curve $y = 1 + 5x - 2x^2$ at the point (1, 4). [2]
-



BLANK PAGE



**BAHAMAS GENERAL CERTIFICATE OF SECONDARY EDUCATION
EXAMINATION**

School No.	Candidate No.	Level:	For Examiner's Use
Subject Number & Title:		Paper:	
Surname & Initials:		Section:	
Signature:	Date:	Qu. No.	

