CARIBBEAN EXAMINATIONS COUNCIL

Caribbean Secondary Education Certificate®
CSEC®

MATHEMATICS

Specimen Papers and Mark Schemes/Keys

Specimen Papers:

Paper 01
Paper 02
Paper 032

Mark Schemes and Key:

Paper 01
Paper 02
Paper 032

The Specimen Papers

Paper 01

1. The Paper 01 consists of 60 items. However, there are 30 items in this specimen paper. The Specimen represents the syllabus topics and the profiles in the same ratio as they will occur on the Paper 01 for the revised syllabus.

2. Vectors and Matrices will be tested on Paper 01.

Paper 02

1. The Paper 02 will be marked electronically. The structure of the actual paper has been modified to allow candidates to write in the spaces following each part of a question. However, in an effort to limit the number of pages in the specimen paper, the spaces for the working were omitted.

2. The topic Sets will no longer be tested on Paper 02.

Paper 032

1. This is a new paper and is designed for candidates whose work cannot be monitored by tutors in recognised educational institutions. The Paper will be of one hour duration and will consist of two questions.

2. The Paper 032 will be marked electronically and the structure, as presented in the specimen, will allow candidates to write in the spaces following each part of a question.

CARIBBEAN EXAMINATIONS COUNCIL

CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION

SPECIMEN MULTIPLE CHOICE QUESTIONS FOR

MATHEMATICS

READ THE FOLLOWING DIRECTIONS CAREFULLY

Each item in this test has four suggested answers lettered (A), (B), (C), (D). Read each item you are about to answer and decide which choice is best.

Sample Item

$2a + 6a =$

(A) $8a$
(B) $8a^2$
(C) $12a$
(D) $12a^2$

Sample Answer

The best answer to this item is "8a", so answer space (A) has been shaded.

There are 30 items in this specimen paper. However, the Paper 01 test consists of 60 items.

LIST OF FORMULAE

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

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

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

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

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

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

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

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

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

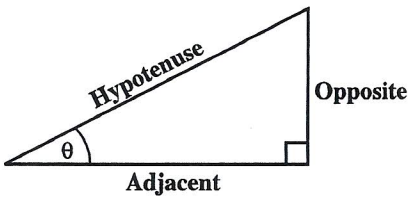
then $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Trigonometric ratios

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

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

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



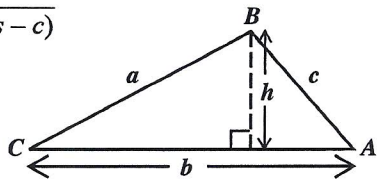
Area of triangle — Area of $\Delta = \frac{1}{2}bh$ where b is the length of the base and h is the perpendicular height.

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. The number 2 747 written to 3 significant figures is

(A) 2 740
(B) 2 750
(C) 274
(D) 275

2. Expressed in scientific notation 0.045×10^{-3} is

(A) 4.5×10^{-1}
(B) 4.5×10^{-4}
(C) 4.5×10^{-5}
(D) 4.5×10^{-6}

3. The value of $\frac{(5+2)^3}{5^2 - 2^2}$ in its simplest form is

(A) $\frac{8}{21}$

(B) $\frac{7}{3}$

(C) $\frac{7}{2}$

(D) $\frac{49}{3}$

4. How much simple interest is due on a loan of \$1 200 for two years if the annual rate of interest is $5\frac{1}{2}$ per cent?

(A) \$120.00
(B) \$132.00
(C) \$264.00
(D) \$330.00

Item **5** refers to the chart shown below.

Rate on Fixed Deposits	
2014	7.8%
2015	7.5%

5. How much more interest did a fixed deposit of \$10 000 earn in 2015 than in 2014?

(A) \$ 0.30
(B) \$ 3.00
(C) \$30.00
(D) \$33.00

6. Tom bought a pen for \$60. He sold it to gain 20% on his cost. How much money did he gain?

(A) \$12
(B) \$40
(C) \$72
(D) \$80

7. The Water Authority charges \$10.00 per month for the meter rent, \$25.00 for the first 100 litres and \$1.00 for each additional 10 litres.

What is the total bill for 250 litres used in one month?

(A) \$25.00
(B) \$35.00
(C) \$40.00
(D) \$50.00

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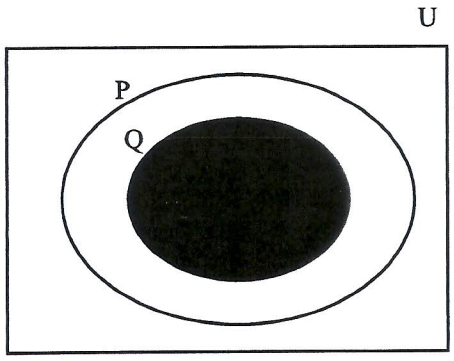
8. Which of the following sets has an infinite number of members?

(A) {factors of 20}
(B) {multiples of 20}
(C) {prime numbers less than 20}
(D) {odd numbers between 10 and 20}

Item 9 refers to the Venn diagram below.



9. The shaded area in the Venn diagram above represents

(A) P'
(B) Q'
(C) $P \cup Q$
(D) $P \cap Q$

10. P and Q are two finite sets such that n(P) = 7, n(Q) = 5 and n(P ∩ Q) = 3. What is n(P ∪ Q)?

(A) 6
(B) 9
(C) 15
(D) 18

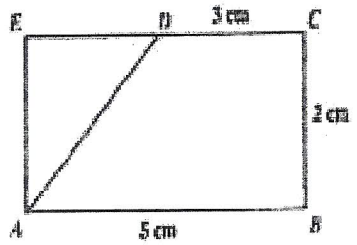
11. How many litres of water would a container whose volume is 36 cm^3 hold?

(A) 0.036
(B) 0.36
(C) 36
(D) 3600

12. A man leaves home at 22:15 hrs and reaches his destination at 04:00 hrs. On the following day, in the same time zone. How long did the journey take?

(A) 5 hrs
(B) $5\frac{3}{4}$ hrs
(C) 6 hrs
(D) $6\frac{1}{4}$ hrs

Item 13 refers to the trapezium below, **not drawn to scale.**



13. *ABCD* is a trapezium and *ADE* is a triangle. Angles *B*, *C* and *E* are right angles.

The area of the trapezium *ABCD* is

(A) 8 cm^2
(B) 16 cm^2
(C) 30 cm^2
(D) 32 cm^2

14. A circular hole with diameter 6 cm is cut from a circular piece of card with a diameter of 12 cm. The area of the remaining card, in cm^2, is

(A) 6π
(B) 27π
(C) 36π
(D) 108π

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15. The mean of ten numbers is 58. If one of the numbers is 40, what is the mean of the other nine?

(A) 18
(B) 60
(C) 162
(D) 540

Items **16–17** refer to the table below which shows the distribution of the ages of 25 children in a choir.

Age	11	12	13	14	15	16
No. of children	6	3	5	4	4	3

16. What is the probability that a child chosen at random is AT LEAST 13 years old?

(A) $\frac{4}{25}$

(B) $\frac{9}{25}$

(C) $\frac{14}{25}$

(D) $\frac{16}{25}$

17. What is the mode of this distribution?

(A) 4
(B) 6
(C) 11
(D) 16

18. Seven times the product of two numbers, a and b, may be written as

(A) $7ab$
(B) $7a + b$
(C) $7a + 7b$
(D) $49\,ab$

19. If $2(x-1) - 3x = 6$, then $x =$

(A) -8
(B) -4
(C) 4
(D) 8

20. $\frac{3x+1}{2} - \frac{x+1}{4} =$

(A) $\frac{7x+3}{4}$

(B) $\frac{7x+1}{4}$

(C) $\frac{5x+1}{4}$

(D) $\frac{5x+3}{4}$

21. The equation of the line which passes through the point $(0, 2)$ and has a gradient of $\frac{1}{3}$ is

(A) $y = 3x$
(B) $y = 3x + 2$
(C) $y = \frac{1}{3}x$
(D) $y = \frac{1}{3}x + 2$

22. If g is a function such that $g(x) = 2x + 1$, which of the following coordinates satisfies the function?

(A) (–3, –5)
(B) (–6, 11)
(C) (5, 2)
(D) (13, 6)

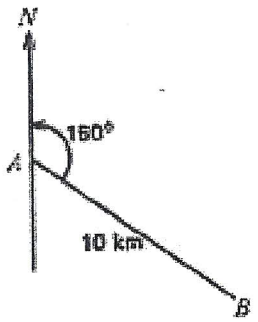
23. What is the gradient of a line which passes through the points (–4, 3) and (–2, 5)?

(A) –4
(B) $\frac{-1}{3}$
(C) $\frac{1}{3}$
(D) 1

24. If $f(x) = 2x - 3$ and $g(x) = 3x + 1$, then $fg(-2)$ is

(A) –13
(B) –7
(C) 5
(D) 20

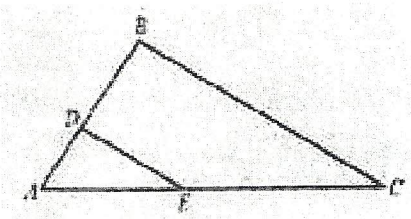
Item 25 refers to the diagram below, **not drawn to scale.**



25. A plane travels from point A on a bearing 150° to point B which is 10 km from A. How far east of A is B?

(A) 10 tan 30°
(B) 10 cos 30°
(C) 10 cos 60°
(D) 10 sin 60°

Item 26 refers to the diagram below, **not drawn to scale.**



26. Triangle ABC is an enlargement of triangle ADE such that

$$\frac{AD}{DB} = \frac{AE}{EC} = \frac{1}{2}$$

If the area $ABC = 36$ cm^2, then the area of $DECB$, in cm^2, is

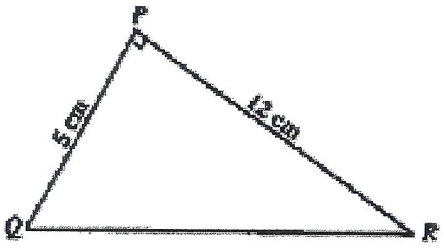
(A) 18
(B) 24
(C) 27
(D) 32

27. The point $P(2, -3)$ is rotated about the origin through an angle of 90° in an anti-clockwise direction.

What are the coordinates of the image P?

(A) (3, 2)
(B) (2, 3)
(C) (−3, 2)
(D) (3, −2)

Item **28** refers to the triangle PQR below, **not drawn to scale.**



28. If angle $QPR = 90°$, $PR = 12$ cm and $PQ = 5$ cm then the length of QR, in cm, is

(A) 7
(B) 11
(C) 13
(D) 17

29. Given that P and Q are points with coordinates $P(1, 3)$ and $Q(-1, 4)$, the position vector $\overrightarrow{PQ}$ is

(A) $\begin{pmatrix} 0 \\ 1 \end{pmatrix}$

(B) $\begin{pmatrix} 0 \\ 7 \end{pmatrix}$

(C) $\begin{pmatrix} -2 \\ 1 \end{pmatrix}$

(D) $\begin{pmatrix} 2 \\ -1 \end{pmatrix}$

30. The transformation matrix $Q = \begin{pmatrix} 2 & 0 \\ 0 & 2 \end{pmatrix}$ represents

(A) a 180° rotation about (0, 2)
(B) a reflection in the line $x = 2$
(C) a reflection in the line $y = 2$
(D) an enlargement by scale factor 2

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

CARIBBEAN EXAMINATIONS COUNCIL

SECONDARY EDUCATION CERTIFICATE

MATHEMATICS

SPECIMEN PAPER 01

Item Number	Specific Objective	Key
1	Number Theory and Computation 9(a)	B
2	Number Theory and Computation 11	C
3	Number Theory and Computation 2	D
4	Consumer Arithmetic 6	B
5	Consumer Arithmetic 10 (e)	C
6	Consumer Arithmetic 4	A
7	Consumer Arithmetic 10 (b)	D
8	Sets 1	B
9	Sets 7	D
10	Sets 4	B
11	Measurement 1	A
12	Measurement 12	B
13	Measurement 6	A
14	Measurement 6	B
15	Statistics 5	B
16	Statistics 13	D
17	Statistics 5	C
18	Algebra 2	A
19	Algebra 10	A
20	Algebra 8	C
21	Relations, Functions & Graphs 9	D
22	Relations, Functions & Graphs 4	A
23	Relations, Functions & Graphs 8	D
24	Relations, Functions & Graphs 19	A
25	Geometry & Trigonometry 13	C
26	Geometry & Trigonometry 5 (c)	D
27	Geometry & Trigonometry 11 (c)	A
28	Geometry & Trigonometry 12	C
29	Vectors & Matrices 3	C
30	Vectors & Matrices 12	D