# MATHEMATICS
## PAPER ONE

**20 23**

SomExams

**Total Score** [ ]

Name.................................................................

School...............................................................

Roll No..............................................................

## Republic of Somaliland

## Somaliland National Examination Board

## Form Four

# MATHEMATICS
# PAPER ONE

### 2022- 2023
### TIME 2 HOURS

## Plus 10 minutes for reading through the paper

### INSTRUCTIONS TO CANDIDATES

This paper consists of 10 printed pages.
Count them now. Inform the invigilator if there are any pages missing.

PART 1:     20 Multiple Choice Questions         40 Marks

PART 2:     10 Structured Questions              60 Marks


TOTAL     100 Marks

- Answer ALL questions in Part 1 and 2.
- Extra papers and Mobile Not Allowed.

## PART ONE: 20 Multiple choice questions
### Circle the correct answer only.

(40 marks).

1. Simplifying $(3 + 5i) - (5 - 3i)$ is equal to :

   A     $(-2 + 8i)$        B.     $(2 - 8i)$

   C.     $(8 + 2i)$        D.     $(2, + 8i)$

2. In which quadrant does $120^0$ lies?

   A. I                 B.    II

   B. III              C.    IV

3. The marks obtained by a class of 240 students in a mathematics test were shown below. The number of students who obtained grade A is the same as:

   A. 20

   B. 40

   C. 60

   D. 80
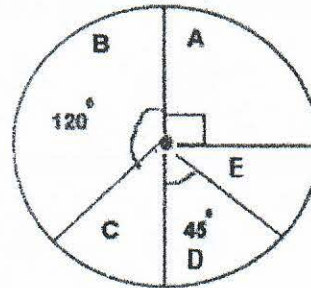


4. The $\frac{d}{dx}(\cos x)$ is :

   A.    cosx      B.    sinx      C.    tanx      D.    - sinx

5. Which one of the following is equivalent to sin 2A ?

   A. $2\cos^2 A - 1$     B. $2\sin A \cos A$     C. $4\sin 2A \cos 2A$     D. $\sin^2 A + \cos^2 A$

6. $\int (3x^2 + 2x)\,dx =$

   A. $x^3 + 2x^2 + c$       B. $3x^2 + 2x^2 + c$     C. $x^3 + x^2 + c$       D. $x^3 - x^2 + c$

3

7. An ordinary dice is thrown once. The probability of getting a prime number is:

A. $\dfrac{1}{3}$

B. $\dfrac{1}{2}$

C. $\dfrac{1}{6}$

D. $\dfrac{2}{3}$
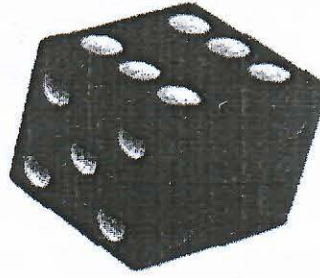
8. The mode of the following numbers, 2, 13, 9, 8, 9, 13, 9 and 5 is:

A. 13　　　　　B. 2　　　　　C. 8　　　　　　　　D. 9

9. The gradient of the curve $y = x^3 - 2x^2 + 5x$ at $x = 1$ is:

A. 5　　　　　B. 4　　　　　C. 2　　　　　　　　D. 12

10. Using the binomial expansion of $(x - 2)^3$ then the coefficient of the x term is:

A. $-6$　　　　B. 12　　　　C. -12　　　　　　D. + 6

11. In how many ways can 2 blue and 3 red balls be arranged in arrow?

A. 10　　　　　B. 20　　　　C. -12　　　　　　D. + 6

12. The area under the curve shown below is equivalent to:

A. 32　sq units

B. 160　sq units

C. $\dfrac{32}{3}$ sq units

D. $\dfrac{160}{3}$ sq units

$y = 4x - x^2$
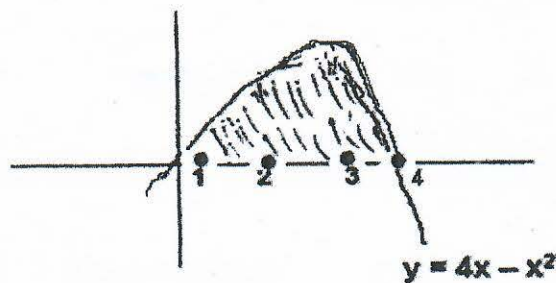
13. Ahmed bought $ 3200 for £ 2000. How many dollars can he buy for £ 8000?

A. $ 3200　　　　B. $ 8000　　　　C. $ 4000　　　　D. $ 12800

14. If $f(x) = 2x + 3$, then $f(-3)$ is:

    A. -3          B. -6          C. -9          D. -12

15. The cost of a car is $ 3600 includes a sales tax (VAT) of 20%. The cost of the Car without sales tax (VAT) is :

    A. $ 3200

    B. $ 2800

    C. $ 2400

    D. $ 3000
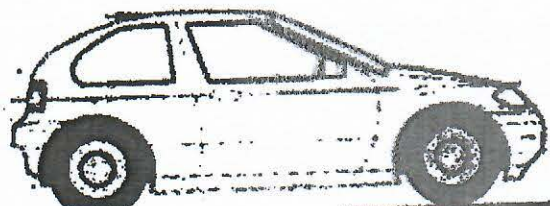
16. The range of the following salaries will be :

$ 200, $ 150, $ 300, $ 120, $ 180, $ 420, $500

    A. $ 120          B. $ 180          C. $ 380          D. $ 300

17. Angle ACB is:

    A. $90^0$

    B. $60^0$

    C. $180^0$

    D. $360^0$
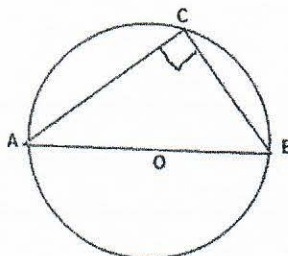
18. The distance between the points A ( 8, 2) and ( 5, -2) is:

    A. 30          B. 25          C. 15          D. 5

19. Evaluate  20% of $ 600

    A. $ 80          B. $ 120          C. $ 620          D. $ 480

20. The length of AB is equal to:

    A. 6

    B. 9

    C. 18

    D. 12
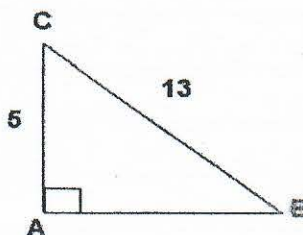
## PART TWO : <u>STRUCTURED QUESTIONS. ANSWER ALL QUESTIONS</u>. (60 Marks)

Q1. Simplify the following

    a) $(2 + 3i) + (3 + 2i)$     (2 marks)

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    b) $(5 + 3i)(5 - 3i)$     (2 marks)

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    c) $i^5 + i^7$     (2 marks)

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Q2. Given that $\cos\theta = \dfrac{5}{13}$ , where $\theta$ is an acute angle.

    Find the exact value of

    a) $\cos 2\theta$     (3 marks)

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    b) $\sin 2\theta$     (3 marks)

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Q3. For the following data set: 2, 3, 5, 7, 5, 10, 11, 5

Calculate

a) The mean ( 2 marks)

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b) The median ( 2 marks)

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c) The mode ( 2 marks)

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Q4. Given that the curve $y = 2x^3 + 6x^2 - 5$

Find

a) $\frac{dy}{dx}$ ( 2 marks)

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b) The coordinates of the stationary points of the curve. (4 marks)

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Q5.    A box contains 3 red and 2 white balls. Two balls are drawn at random from the box with replacement using the tree diagram below.
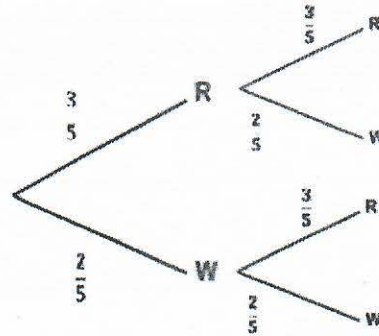


Find the probability of getting

   a)  two red balls                                                              ( 2 marks)

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   b)  two of the same colours                                           ( 2 marks)

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   c)  two of different colours                                            ( 2 marks)

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Q6. Verify each of the following identities

   a)  $\sin(\pi - \theta) = + \sin\theta$                                    ( 3 marks)

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   b) $\cos 40^0 \cos 50^0 - \sin 40^0 \sin 50^0 = 0$            ( 3 marks)

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Q7. Given that f(x) = 2x + 5

Find

a) f (2) ( 2 marks)

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b) $f^{-1}(x)$ ( 2 marks)

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c) $f^{-1}(1)$ ( 2 marks)

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Q8. If an equation of a circle is $(x - 2)^2 + (y + 3)^2 = 25$

Find

a) the radius ( 3 marks)

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b) the centre of the circle ( 3 marks)

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Q9. Given that $A = \begin{bmatrix} 2 & -3 \\ 4 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 1 \\ 7 & 3 \end{bmatrix}$

Calculate

a) A + B                                                                    ( 2 marks)

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b) the determinant of B                                              ( 2 marks)

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c) the inverse of B                                                    ( 2 marks)

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Q 10.

a) A real estate gets 6% commission for selling a house, if they sold a house for
$ 45000. What is its commission?                                ( 3 marks)

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b) The selling price of a car is $ 5000; the salesman gives 20% discount for cash.
What is the discount price?                                       ( 3 marks)

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