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Total Score

Name.....

School

Roll No

Republic of Somaliland
Somaliland National Examination Board

Form Four

MATHEMATICS
PAPER TWO

JUNE 2019

TIME 2 HOURS

Plus 10 minutes for reading through the paper

INSTRUCTIONS TO CANDIDATES

This paper consists of 12 printed pages.
Count them now. Inform the invigilator if there are any pages missing.

PART 1:	20 Multiple Choice Questions	40 Marks
PART 2:	8 Structured Questions	60 Marks

TOTAL 100 Marks

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

Use this page for rough work. It will **NOT** be marked.

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PART ONE: 20 MULTIPLE CHOICE QUESTIONS**(20 x 2 = 40 marks).****Circle the correct answer only.**

1. Which of these numbers is not irrational?

A. $\sqrt{12}$

B. $\sqrt{121}$

C. $3\sqrt{8}$

D. $(64)^{\frac{2}{5}}$

2. Given :

$A = \{ 5, 7, 9, 15, 20 \}, B = \{ 6, 8, 10, 12, 20, 18 \}$ then :

A) $A \cap B = \{ 5, 6, 7, 8, 9, 10, 12, 15, 18, 20 \}$ B) $A \cap B = \{ 5, 7, 15, 20 \}$

C) $A \cap B = \{ 15, 20 \}$

C) $A \cap B = \{ 20 \}$

3. If 6 tickets for a play cost 48000, calculate the cost of 15 tickets?

A. 9,600

B. 408,000

C. 120,000

D. 81,6000

4. If
- $f(x) = 2x + 1$
- and
- $g(x) = 3x + 4$
- , write down
- $(f + g)(-3)$

A. -10

B. 15

C. -15

D. 10

5. Is the point
- $(0.1, 3.1)$
- inside, outside or on the given equation.

$$x^2 + y^2 - 2x + 4y + 3 = 0$$

A. Inside

B. outside

C. On equation

D. none

6. A ticket is randomly selected from a basket containing 4 green, 6 yellow, and 5 blue tickets. Identify the probability of getting green or yellow.

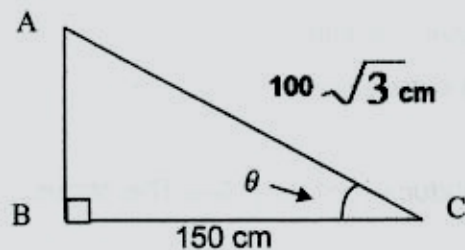
A. $\frac{2}{3}$

B. $\frac{8}{75}$

C. $\frac{5}{12}$

D. $\frac{1}{3}$

7. Given the adjacent right triangle with
- $\angle B = 90^\circ$
- ,
- $\overline{BC} = 150$
- cm,
- $\overline{AC} = 100\sqrt{3}$
- ,

Find the angle (θ) 

A. 45°

B. 60°

C. 25°

D. 30°

8. Solve :

$$2\cos x - \sqrt{3} = 0 \text{ for the principal values of } x.$$

- A. 30° B. 60° C. 45° D. 0°

9. Calculate

$$\sin^{-1}x \text{ for } x = \frac{\sqrt{3}}{2}$$

- A. 60° B. -65° C. 300° D. 210°

10. $(6, 210^\circ)$ converted to Cartesian coordinates is :

- A. $(-3, -3\sqrt{3})$ B. $(-3\sqrt{3}, -3)$
C. $(3, -3\sqrt{3})$ D. $(-3, 3\sqrt{3})$

11. A particle is moving in a straight line and its acceleration in m/sec^2 is

$$a(t) = -30t + 12t^2. \text{ Calculate its velocity when } t = 3 \text{ sec.}$$

- A. 27 m/s B. 15 m/s C. -13 m/s D. -15 m/s

12. Integrate by using substitution, $y = \int_0^1 (x^2 + 3x)^2 (2x + 3) dx$

- A. $\frac{64}{3}$ B. $\frac{64}{5}$ C. 31 D. 13

13. Calculate the area between the curve $y = x^2$ and the line $y = 4$

- A. 11 B. $\frac{16}{3}$ C. $\frac{32}{3}$ D. 5.53

14. A correlation which indicates the extent to which one variable increase as the other decreases is :

- A. Positive correlation B. Negative correlation
C. Zero correlation D. Minus correlation

15. Records show that 60 out of 3600 bulbs produced are defective. The probability of a newly produced bulb being defective is :

- A. 0.0166 B. 0.017 C. 0.016 D. $\frac{1}{60}$

16. The odds in favour of an event are 3:8. The probability of its occurrence is :

- A. $\frac{3}{11}$ B. $\frac{3}{8}$ C. $\frac{5}{8}$ D. $\frac{8}{11}$

17. Combining the probability of a die showing even, prime and less than 3 is :

- A. $\frac{7}{6}$ B. $\frac{4}{3}$ C. $\frac{1}{12}$ D. $\frac{3}{4}$

18. What integer is equal to $8!$:

- A. 4320 B. 4032 C. 40320 D. 43020

19. Simplify: $(4 + 3i) \div (2 + i)$

- A. $\frac{11}{5} + \frac{2}{5}ii$ B. $\frac{11}{5} - \frac{2}{5}ii$ C. $\frac{2}{5} + \frac{11}{5}ii$ D. $\frac{2}{5} - \frac{11}{5}ii$

20. Evaluate for x and y that make the statement true:

$$3x - 5yi = 12 - 20i$$

- A. (4, 4) B. (-4, -4) C. (-4, 4) D. (4, -4)

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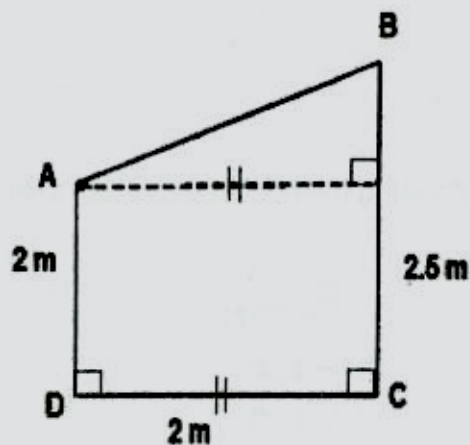
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PART 2: STRUCTURED QUESTIONS. ANSWER ALL QUESTIONS..**(60 Marks)**

Q1. The following picture shows a shed. Calculate:



a) The length AB of the roof

(3 marks)

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b) The area of the trapezium ABCD

(3 marks)

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Q2. Compute the area between the two curves $y = x^2 - 12$ and $y = 6 - x^2$ (7 marks)

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Q3. Solve $2 \tan x \sin x + 2 \sin x = \tan x + 1$ (8 marks)

For $0 \leq x \leq 2\pi$

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Q4. A rock is tossed from a bridge $73.5 \text{ m} = (4.9 \times 15) \text{ m}$ above the water. The height of the rock is $h(t) = -4.9t^2 + 9.8t + 73.5$. Calculate: (8 marks)

a) The time the rock reaches its maximum height

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b) The maximum height reached

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c) The time the rocks hits the water

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d) With what velocity does it hit the water ?

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Q5. Wajale's average monthly rainfall in mm, in the year 2018, is shown in the below table

Months	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Av. Monthly rainfall	10	8	23	54	47	26	30	45	40	20	10	7

Calculate

a) The yearly average rainfall.

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b) Oct-March average rainfall

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c) April – Sept. average rainfall

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Q6. Given $Z_1 = 4 \left(\cos \frac{\pi}{6} + i \sin \frac{\pi}{6} \right)$ & $Z_2 = 2 \left(\cos \frac{\pi}{3} + i \sin \frac{\pi}{3} \right)$. Work out and write

both(a) and (b) in rectangular form ($a+ bi$). (8 marks)

a) $Z_1 \cdot Z_2$.

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b) $\frac{Z_1}{Z_2}$

7. Analyse the complex equation to get the cubic root of $Z = -8 + 0i$. (8 marks)

8. From a bag containing 4 red, 6 white and 5 blue balls, 3 balls are drawn one after the other and replaced each time. $E_1 = \text{red}$, $E_2 = \text{white}$ and $E_3 = \text{blue}$.

a. Calculate $P(E_1 \cap E_2 \cap E_3)$

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b. If there is no replacement, compute the probability of obtaining 1st ball red, 2nd ball white and 3rd ball blue.

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c. If there is no replacement, find $P(E_1 \cup E_2 \cup E_3)$

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