R&PUBL IC OF SOMALILAND

FORM FOUR EXAMS, 2022

MATHEMATICS

2022

NATIONAL EXAMINATION BOARD

SomExams

UK

Total Score

Name.....

School .....

Roll No .....

Republic of Somaliland

Somaliland National Examination Board

Form Four

MATHEMATICS
PAPER TWO

2021 - 2022

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 / extra.

The exam consisting 2 parts:

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 mobiles are NOT allowed

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

PART 1: Multiple choice Questions. **(40 marks).**

Circle the correct answer, each question carries 2 marks.

1. Convert 240^0 to π radian answer is :

   A. $\frac{3}{4}\pi$

   B. $\frac{4}{3}\pi$

   C. $\frac{5}{4}\pi$

   D. $\frac{5}{6}\pi$

2. -4π converted to degrees is :

   A) -720^0 B) 720^0 C) 1440^0 D) 440^0

3. The length of an arc of a circle with radius 4 cm is 7 cm. The angle this arc makes at the centre in radians is :

   A) 1,75 rad. B) 1.82 rad C) 1.69 rad D) 1.57 rad

4. The area of a sector with central angle 60^0 from a circle of radius 9 cm is :

   A) $\frac{21}{2}\pi$ cm^2

   B) $\frac{23}{2}\pi$ cm^2

   C) $\frac{27}{6}\pi$ cm^2

   D) $\frac{29}{6}\pi$ cm^2

5. $\lim_{x\to 4}\left(\frac{x^3+4x^2-16x-64}{x-4}\right)$ is :

   A) 0 B) 64 C) -16 D) 48

6. $\lim_{x\to\infty}\left(\frac{4x^3+2x^2+1}{x^2-2x}\right)$ is :

   A) 0 B) 4 C) ∞ D) 2

7. The gradient of the curve $y = \frac{1}{2\sqrt{x^5}}$ at $x = 1$ is:

A) $\frac{1}{2\sqrt{7}}$

B) $\frac{1}{2\sqrt{x7}}$

C) $\frac{1}{2\sqrt{2}}$

D) $\frac{1}{2}$

8. The derivative of $y = \sqrt{x}\,(x^3 - 1)$ is :

A) $\frac{7}{2}\sqrt{x^6} - \frac{1}{2\sqrt{x}}$

B) $\frac{7}{2}\sqrt{x^5} - \frac{\sqrt{x^3}}{2}$

C) $\frac{7}{2}\sqrt{x^5} - \frac{1}{2x}$

D) $\frac{7}{2}\sqrt{x^7} - \frac{1}{2\sqrt{x}}$

9. The coordinate of the stationary point on the curve $y = x^2 - 8x + 10$ is

A) (-6, 4) B) (4, 6) C) (4, -6) D) (-6, -4)

10. The variance of 1, 2, 3, 4, 5 is :

A) 1.9 B) 2.9 C) 3 .6 D) 4. 5

11. The IQR of 8, 11, 13, 15, 18, 26, 29, 31, 33, 36 is

A) 18 B) 20 C) 16 D) 17.5

12. The 70th percentile of the data in Q.11 above is :

A) 26 B) 27 C) 30 D) 32

13. Twenty cards are numbered from 1 to 20. A card is chosen at random what is the probability that it is composite

A) $\frac{9}{10}$ B) $\frac{10}{19}$ C) $\frac{11}{20}$ D) $\frac{12}{19}$

14. A card is chosen from a complete deck of card. What is the probability that it is either a face card or black?

A) $\frac{12}{13}$

B) $\frac{19}{26}$

C) $\frac{33}{52}$

D) $\frac{25}{52}$

15. The value of ${}_7P_5$ is equivalent to :

A) ${}_7P_2$ B) ${}_5P_2$ C) 40 D) 38

16. The value $({}_6P_3 - {}_5P_2)$ is

A) 70 B) 80 C) 90 D) 100

17. The combination ${}_{13}C_1$ added 4 times is equal to :

A) $4 \times {}_{13}C_1$ B) 13^4 C) ${}_{13}C_4$ D) 4×13

18. The simplified value of $\frac{4 - 3i}{12 + 5i}$

A) $\frac{56}{169} - \frac{33i}{169}$

B) $\frac{33}{169} - \frac{56i}{169}$

C) $\frac{89i}{169}$

D) $\frac{23i}{169}$

19. The values of x and y that make $3x - 5yi = 12 + 20$ true are :

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

20. The value of r and θ that make $2\sqrt{3} - 2$ I true are :

A) $\left(4 , \frac{-\pi}{2} \right)$

B) $\left(4 , \frac{5\pi}{3} \right)$

C) $\left(-4 , \frac{-\pi}{3} \right)$

D) $\left(4 , \frac{\pi}{3} \right)$

PART 2: ANSWER ALL QUESTIONS. **(60 MARKS)**

1. a). Write the complex number $Z_1 = -2 - 2\sqrt{3}\,i$ in polar form. (4 marks)

.....

.....

.....

.....

b) Multiply Z_1 (above) by $Z_2 = \sqrt{8}\left[\cos -\left(\frac{-\pi}{3}\right) + c\sin\left(\frac{-\pi}{3}\right)\right.$ (2 marks)

.....

.....

.....

.....

.....

2. Given $Z_1 = 24\,[\cos 300^0 + i\sin 300^0]$ and $Z_2 = 8\,[\cos 75^0 + i\sin 75^0]$

Find :

a) $\frac{Z_1}{Z_2}$ = (3 MARKS)

.....

.....

.....

.....

.....

b) The cubic root of $Z_3 = 8\,[\cos 135^0 + i\sin 135^0]$ (3 marks)

.....

.....

.....

.....

.....

3. Evaluate

a) Sin 105^0 (2 marks)

.....

.....

.....

b) Cos 945^0 (2 marks)

.....

.....

.....

c) Tan 285^0 (2 marks)

.....

.....

.....

4. a) Find sin (A+B) if sin A = $\frac{-4}{5}$ and cos B = $\frac{15}{17}$

A and B are in Quadrant IV. Also state Quadrant of (A + B) (4 marks)

.....

.....

.....

.....

.....

.....

b) Prove that csc $(\pi + x) = -\csc x$ (2 marks)

.....

.....

.....

.....

.....

.....

5. a) Verify that sin c + sin D = 2 sin $\left(\frac{C+D}{2}\right)$ COS $\left(\frac{C-D}{2}\right)$ (4 MARKS)

b.) verify that sin$\propto$ cos B = ½ sin $[(\propto +B) + \sin(\propto -B)]$ (2 marks)

6. a) Convert $y^2 = 4x$ into a polar coordinate (3 marks)

.....

.....

.....

.....

.....

b.) Convert $r^2 + 4r\cos\theta - 8r\sin\theta = -4$ to Cartesian equation (3 marks)

.....

.....

.....

.....

.....

7. a) Given $u = \sqrt{x}$, $v = (2x - 3)$ find the derivative of $y = u.v$ (3 marks)

.....

.....

.....

.....

.....

.....

.....

b.) Given $u = 1+3x$ and $v = x^2 + 1$ find $\frac{dy}{dx}$ when $y = \frac{u}{v}$ (3 marks)

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

8. a) Find the equation of the tangent to the curve $y = x^2$ at the point (3, 9)
(3 marks)

.....
.....
.....
.....
.....
.....
.....

b.) Find the equation of the normal $y = \frac{8}{\sqrt{x}}$ to at the point $x = 4$ (3 marks)

.....
.....
.....
.....
.....
.....
.....

9. a.) Determine the nature of the curve $y = x^3 + 3x^2 - 9x + 5$ (3 marks)

.....
.....
.....
.....
.....
.....
.....
.....
.....

b) Find the volume of the solid formed by $y = \sqrt{x}$ for $o \leq x \leq 3$ is revolved about the x - axis . (use) $v = .\pi \int_0^3 (\sqrt{x})^2 dx$ (3 marks)

.....

.....

.....

.....

.....

10. a) Find the std deviation of 1, 2, 3, 4, 5. (2 marks)

.....

.....

.....

.....

.....

.....

b)Given

Mass	10 - 20	20 – 30	30 -40	40 – 50	50 -60	60 -70	70- 80	80 -90
Freq	3	6	7	8	10	7	6	3

Find: i) Lower quartile L = 30, cf = 9m f = 7, c = 10, n = 50 (4 marks)

ii) L = 50, cf = 24, f = 10, c =10 , n = 50

.....

.....

.....

.....

.....

.....

.....

END