

FEDERAL REPUBLIC OF SOMALIA

GRADE 12 EXAMS, 2020

MATH



OFFICE OF EXAMINATIONS AND CERTIFICATION





FEDERAL REPUBLIC OF SOMALIA
MINISTRY OF EDUCATION CULTURE AND HIGHER EDUCATION
OFFICE OF EXAMINATIONS AND CERTIFICATION

Somali Certificate for Secondary Education

Subject:	Mathematics
Grade:	12
Exam Year:	2020
Total Marks:	100
Allowed Time	2 hours

Please read all the instructions carefully before attempting the questions:

- Write your full name, roll number and school name in English on the space provided on your answer booklet.
- Write all your answers on the answer booklet. Answers on the question paper will not be marked.
- Write legibly in dark blue pen **only**.
- Answer all questions as provided in the question paper.
- All rough work must be on the answer booklet. Any work outside of the answer booklet will not be marked.
- Adhere to examination regulations and allowed time.

Check that your examination question paper has 5 printed pages excluding the cover page.

PARTA: Multiple Choice Questions (40 marks)

Choose the correct answer and write it in the answer booklet.

1. Choose the number when increased by 12, becomes 20.

7	8	12	10
---	---	----	----

2. If a card is picked at random from a pack of playing cards, the probability of getting a king of spades is:

$\frac{1}{13}$	$\frac{1}{52}$	$\frac{1}{26}$	$\frac{4}{13}$
----------------	----------------	----------------	----------------

3. The mode of the following set of data: 4, 9, 3, 7, 5, 6, 7, 8, 7 is:

8	5	4	7
---	---	---	---

4. $\cos(A+B)$ is equal to:

$\cos A \cos B + \sin A \sin B$	$\sin A \cos B + \cos A \sin B$
$\cos A \cos B - \sin A \sin B$	$\sin A \cos B - \cos A \sin B$

5. The sum of $(3 - i) + (2 + 3i)$ is:

$5 + 2i$	$5 - 2i$	$6 + 3i$	$2 + 5i$
----------	----------	----------	----------

6. The radius of a circle with an equation of: $x^2 + y^2 = 25$ is:

25	10	5	15
----	----	---	----

7. What is the determinant of a given matrix = $\begin{bmatrix} 8 & 3 \\ 4 & 2 \end{bmatrix}$?

20	4	10	-4
----	---	----	----

8. The value of $\lim_{x \rightarrow 2} (5x + 4)$ is equal to

14	10	5	11
----	----	---	----

9. The simplest form of $\left(\frac{1}{25}\right)^{\frac{3}{2}}$ is

8	27	15	125
---	----	----	-----

10. Calculate $\frac{dy}{dx}$ when $y = 3x^2 + 5x + 10$

$6x + 5$	$6x + 10$	$3x + 5$	$6x^2 + 5$
----------	-----------	----------	------------

11. State the simplest form of $\frac{\cos 2x}{\cos x - \sin x}$.

$\cos x + \sin x$	$\cos x \sin x$	$\cos x - \sin x$	$\sin x$
-------------------	-----------------	-------------------	----------

12. What is the value of i^{25} ?

i	$-i$	5	$i+1$
-----	------	-----	-------

13. State the number of ways in which two books can be selected from a group of 5.

20	-25	15	15
------	-------	------	------

14. State the focus of the parabola where the equation is $y = -16x^2$.

4	-8	16	-4
-----	------	------	------

15. How many sides does a polygon have if the sum of its interior angles is 720° ?

7 sides	8 sides	6 sides	5 sides
-------------------	-------------------	-------------------	-------------------

16. A box contains 3 red, 4 blue and 3 green beads. The probability of selecting a blue or red bead at random will be:

$\frac{10}{7}$	$\frac{5}{4}$	$\frac{3}{11}$	$\frac{7}{10}$
----------------	---------------	----------------	----------------

17. If $\sin A = \frac{5}{13}$ and $\cos B = \frac{4}{5}$, where A and B are in the 2nd quadrant. The value of $\sin(A+B)$ is:

$\frac{7}{60}$	$-\frac{16}{65}$	$\frac{65}{33}$	$\frac{7}{12}$
----------------	------------------	-----------------	----------------

18. The integration of $\int dx$ is

dx	x	Zero	$x + c$
------	-----	------	---------

19. If the number of boys is 320 out of 500 students, what will be the percentage of girls in the school.

40%	36%	27%	39%
-----	-----	-----	-----

20. The derivative of a constant number $f(x) = C$, will be

Cx	$-2c$	Zero	$C + 1$
------	-------	------	---------

PART B: Structured Questions (60 marks)

Answer all of the following questions and write your answer in the answer booklet.

21. Trigonometry (10 marks)

a) If $\sin B = \frac{3}{5}$ and $\cos B = \frac{4}{5}$ then find:

i. $\sin 2B$ (1marks)

ii. $\cos 2B$ (1marks)

b) Write the difference of $\sin 7A - \sin 3A$ as a product.(3marks)

c) Use half angle identity to find the exact value of $\tan 15^\circ$ (2marks)

d) Calculate the area of a triangle, two sides of which are 8cm and 11cm and its perimeter is 32cm.
.....(3marks)

22. Complex numbers (10 marks)

a) Perform the following operations:

i. $(8 - i) - (4 - i)$ (2 marks)

ii. $(3 + 2i)^2$ (2 marks)

b) Use the quadratic Formula to solve $x^2 - 2x + 2 = 0$ (3 marks)

c) Write the conjugate of $3 + 2i$ (3 mark)

23. Probability (10 marks)

a) Calculate the following:

i. $P(8,3)$ (1 marks)

ii. $C(7,4)$ (1 marks)

b) A box contains 3 blue, 7 green and 11 red balls. What is the probability that a ball selected at random will be red? (2 marks)

c) Find the probability of getting a sum of 7 and 4 of the first and the second throw of two dices. (2marks)

d) If adice is flipped, what is the probability of getting:

i. An even number (1 mark)

ii. A number less than 5 (1 mark)

e) If the probability of success is $\frac{1}{4}$. Find the probability of failure? (2 marks)

24. Statistics (15 marks)

a) Find the mean of 8, 5, 14,6,4,12. (2 marks)

b) If you are given a set of data 12, 17, 6, 9,8,9,16,15, 10. Calculate the:

i. Lower quartile (Q1) (2 marks)

ii. Upper Quartile (2 marks)

iii. Range (1 mark)

c) Complete the table below

(2 marks)

Class	Frequency (F)	Cumulative frequency
30-39	3	
40-49	13	
50-59	14	
60-69	6	
70-79	4	

i. Work out the cumulative frequency and the median.

(2 marks)

d) Calculate the variance of the following data: 7, 15, 12, 17, 20, 14, 9

(2 marks)

e) Find the mean of the following data: 45,21,53,49,50,37,48,30

(2 marks)

25. Calculus (15 marks)

a) Evaluate the limits of:

a) $\lim_{x \rightarrow 3} \sqrt[3]{x^2 - 1}$

(3 marks)

b) Find the derivative of each function

a) $y = \frac{2x-3}{x+4}$

(2 marks)

c) Calculate the equation of the tangent line to a curve $y = x^2$ at point $P(2, 4)$

(3 marks)

d) Evaluate $\int_0^2 (3x^2 + 2x + 1) dx$

(3 marks)

e) A mother is three times heavier than her daughter and together they weigh 72kg. Find the weight of each.

(2marks)

f) Find the gradient of the equation $2x + 3y - 6 = 0$.

(2 marks)