

WASAARADDA WAXBARASHADA IYO TACLIINTA  
SARE

IMTIXAANKA FASALKA 8AAD. 2020

**XISAAB**



XAFIISKA IMTIXAANAADKA PUNTLAND



MINISTRY OF EDUCATION AND HIGHER EDUCATION  
PUNTLAND NATIONAL EXAMINATIONS BOARD

Code Number

FORM FOUR EXAMINATION 2020  
TIME: 1 HOUR AND 30 MINUTES

# MATHEMATICS

### Instructions to candidates

- Answer all the questions
- This paper consists of 7 pages, count it and if any is missing inform your invigilator
- Do not write your **name and roll number** on the exam paper
- Make sure that **student's profile** is attached to the exam paper, if not, inform you invigilator.
- No extra paper is allowed.
- If you make a mistake, **cross out the incorrect answer and write your correct answer.**

This exam paper consists of following parts

Parts	Marks
Part one: Multiple Choice	10 marks
Part two: Basic mathematics	40 marks
Part three: Structured question	50 marks
<b>Total: 100 Marks</b>	

For the markers only

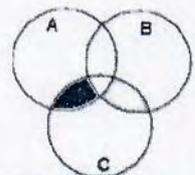
PARTS	MARKS
Part one	
Part two	
Part three	
TOTAL	



**SOM EXAMS**

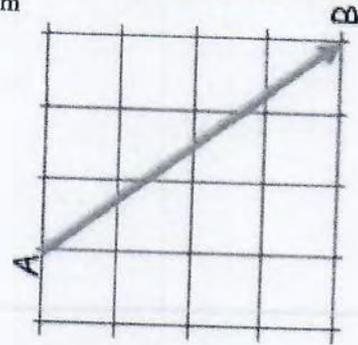
**Part one: Multiple choice****( 10 marks)****Circle the correct answer**

- 1) Expressing as percentage  $\frac{3}{5}$  is equal to
- A. 40%  
B. 60%  
C. 50%  
D. 30%
- 2)  $y^3 \div y^4$  is equal to
- A.  $y^1$   
B.  $y^7$   
C.  $y^{-1}$   
D.  $y^{12}$
- 3) The HCF of 24 and 60 is
- A. 8  
B. 12  
C. 20  
D. 15
- 4) The median of this data 51, 42, 50, 33, 45, 40, 60 is
- A. 33  
B. 50  
C. 42  
D. 45
- 5) Change 1200 m in to km
- A. 1.2 km  
B. 12 km  
C. 120 km  
D. 0.12 km
- 6) The value of x in this equation  $\frac{4x}{5} = 8$  is:
- A. 10  
B. 20  
C. 15  
D. 12
- 7) The shaded region in the diagram below represents
- A.  $A \cap B$   
B.  $A \cap C$   
C.  $C \cap B$   
D.  $A \cap B \cap C$
- 8) There are 3 green balls and 4 yellow balls in a bag. The probability of drawing a green ball is:
- A.  $\frac{4}{7}$   
B.  $\frac{3}{7}$   
C.  $\frac{2}{7}$   
D. 1
- 9) The gradient of this line  $2y = 4x - 8$  is equal to
- A. -2  
B. 4  
C. -4  
D. 2



10) The column vector of vector AB is

- a.  $\begin{pmatrix} 3 \\ 4 \end{pmatrix}$
- b.  $\begin{pmatrix} 4 \\ -3 \end{pmatrix}$
- c.  $\begin{pmatrix} 4 \\ 3 \end{pmatrix}$
- d.  $\begin{pmatrix} 4 \\ 4 \end{pmatrix}$

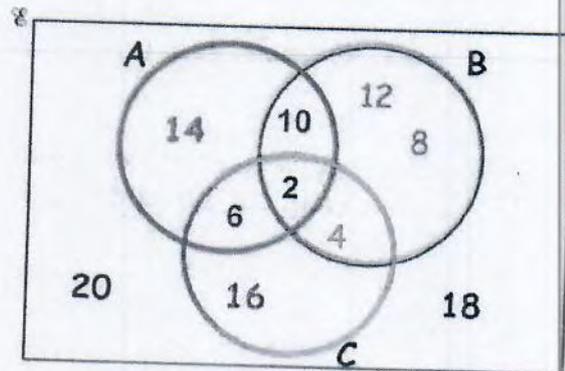


**Part two:- Structured question of basic mathematics (40 marks)**

**Question 1**

From the venn diagram, find the following sets

- a)  $A \cap C \cap B = \{ \dots \dots \dots \}$  (1 mark)
- b)  $A \cup C = \{ \dots \dots \dots \}$  (3 marks)
- c) *complementary of  $(A \cup B \cup C)$*   
 $(A \cup B \cup C)' = \{ \dots \dots \dots \}$  (2 mark)
- d)  $n(A \cup B \cup C) = \{ \dots \dots \dots \}$  (1 mark)
- e) Describe the universal set in words (2 marks)



**Question 2**

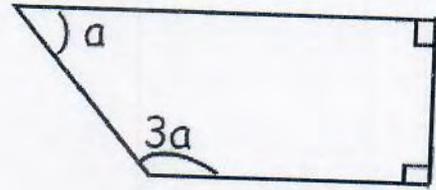
- a) Simplify
  - i)  $4(3x - 11) + 10x - 33$  (2 marks)
  - ii) Rationalize  $\frac{14}{\sqrt{7}}$  (2 marks)
  - iii) Find the value of  $\frac{2q}{5} + \frac{3w}{2} - 3p$  (3 marks)  
 If  $w = 4$ ,  $p = 5$  and  $q = 15$



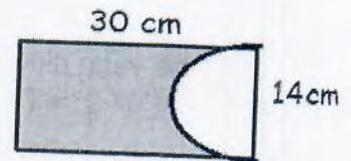
**Question 3**

- a) Find the value of **a** in the shape below

(3 marks)



- b) Find the shaded area in the shape below  
(4 marks)



- c) A piece of carpet is 240cm long. Mr. Yusuf cuts it into three pieces in the ratio 1 : 2 : 5.  
Work out the length of each piece of the carpets.  
(3 marks)

Shortest piece =

Middle piece =

Longest piece =

d) Solve  $\frac{2x+3}{5} = \frac{x+2}{3}$

(2 marks)

**Question 4**

- a) Make **y** the subject of the formula

$$p = \frac{xy}{x+y}$$

(2 marks)

- b) Solve the inequality and write the solution set  
 $2x + 3 \geq x + 1$

(3 marks)



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c) Illustrate the solution set of the inequality on the number line below



(2 marks)

d) Conversion

i) Change in to fraction (write in simplest form)

(2 marks)

25% =

ii) Change in to percentage  $\frac{1}{4}$

(2 marks)

iii) Change in to degrees  $\frac{3\pi}{4}$

(2 marks)

**Part three:- Structured questions ( 50 marks)**

**Answer all questions**

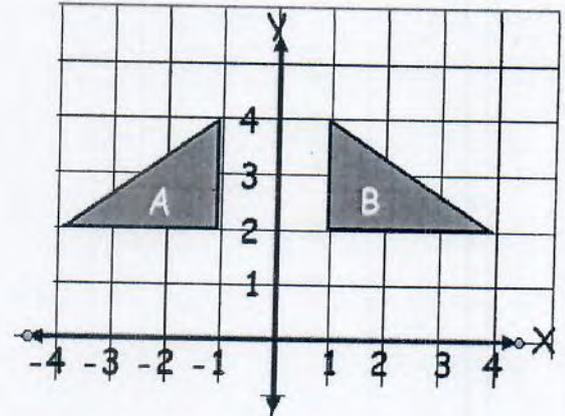
**Question one**

a) In diagram right

i) Write the coordinates of triangle A  
 (....., .....) (....., .....) (....., .....) (6 marks)

ii) Which single transformation makes triangle B from triangle A

..... (2 marks)



b) Given the vectors  $\vec{a} = \begin{pmatrix} 3 \\ 4 \end{pmatrix}$  and  $\vec{b} = \begin{pmatrix} -2 \\ 1 \end{pmatrix}$

Draw in the grid

i)  $\vec{a}$  (1 mark)

ii)  $\vec{b}$  (1 mark)

iii)  $\vec{a} + \vec{b}$  (1 marks)



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- iv) Find magnitude of vector  $\mathbf{a}$  (2 marks)

$$|\vec{a}| =$$

- c) Given these complex numbers  $3 - 4i$  and  $3 + 4i$   
Find  $(3 - 4i)(3 + 4i)$  (2 marks)

### Question two

Given that matrix  $A = \begin{pmatrix} 1 & -2 & 2 \\ 3 & 1 & -2 \end{pmatrix}$ ,  $B = \begin{pmatrix} -1 & 8 & 0 \\ 3 & 2 & 1 \end{pmatrix}$  and  $C = \begin{pmatrix} 2 & 2 \\ 3 & 2 \end{pmatrix}$ . Find

a)  $A + B$

(4 marks)

b)  $C \times B$

(4 marks)

c)  $C^{-1}$  inverse of matrix  $C$

(4 marks)



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**Question three**

a) Find  $\lim_{x \rightarrow 5} \frac{x^2 + x + 10}{x + 5} =$

( 2 marks)

b) Find  ${}^6P_2 =$

(2 marks)

**Question four**

A particle moves so that its velocity in m/s is given by  $V(t) = t^2 + 2t + 3$

a) Find velocity of the particle after  $t = 2$ sec

(2 marks)

b) Find its acceleration after 3 sec

( 3 marks)

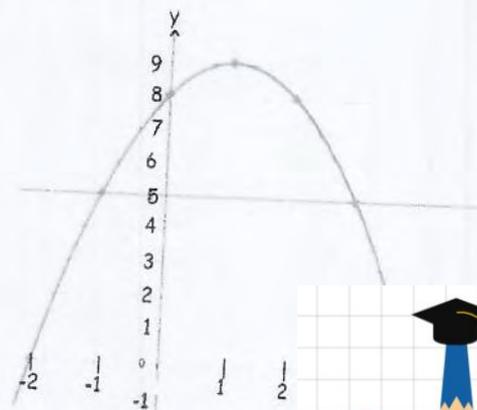
c) Write the missing features from the graph

i) The parabola has a .....(maximum or minimum) value (1 marks)

ii) The y-intercept is ..... (1 marks)

iii) The X-intercepts are ..... and ..... (1 marks)

iv) The coordinates of the stationary point is (..... , ..... ) (1 marks)



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**Question five**

The frequency distribution table below shows the time taken to complete a 100m race by 25 students

a) Complete the table (2 marks)

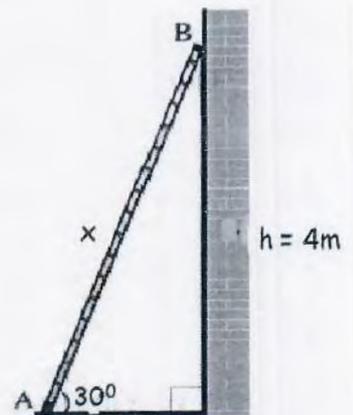
Time (s)	Frequency f	Midpoint x	fx
10 – 14	1	12	.....
15 – 19	6	17	.....
20 – 24	9	22	9x22= 198
25 – 29	5	27	.....
30 – 34	4	32	.....
	$\Sigma f = 25$		$\Sigma fx = \dots\dots\dots$

b) Which is the modal class? (1 marks)

c) Find the mean (2 marks)

**Question six**

a) A ladder leans against a vertical wall which is 4m high, and the angle that the ladder makes with the horizontal ground is 30°. Find the length of the ladder? (2mrks)



b) Proof this identity  $(1 - \sin^2\theta) \sec^2\theta = 1$  (3 marks)

End

