

MINISTRY OF EDUCATION AND HIGHER EDUCATION

GRADE 12 EXAMS, 2008

# MATHEMATICS



P/LAND NATIONAL EXAMINATION BOARD



Name.....

School .....

Roll Number.....

**Puntland State of Somalia**

**Ministry of Education**

**Puntland National Examination Board**

**Form 4**

**MATHEMATICS Examination**

**June 2008**

Time 2 hours

**Plus 10 minutes before the exam for reading through the paper**

**TOTAL TIME 2 hours 10 minutes**

### **INSTRUCTIONS TO CANDIDATES**

This paper consists of 14 printed pages.  
Count them now. Inform the invigilator if there are any missing.

PART ONE ( 10 Multiple choice questions): 10 marks

PART TWO (10 Structured questions): 90 marks

TOTAL 100 marks

- Answer ALL questions.
- All answers and working must be written on this paper in the spaces provided immediately after each question.
- Rough work can be done on page 2. This will not be marked
- No extra paper is allowed.
- No calculators are allowed.
- If you make a mistake cross out the incorrect answer clearly and write your correct answer.



**Use this page for rough work, it will not be marked**

A series of horizontal dotted lines spanning the width of the page, intended for rough work.

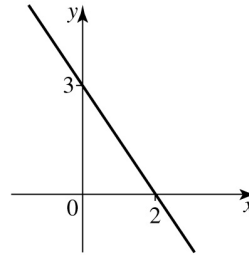
**PART 1: Multiple Choice questions. Circle the correct answer.**

1.  ${}^9P_2$  is equal to

- A) 36    B) 48    C) 72    D) 84

2. The equation of the line drawn below is:

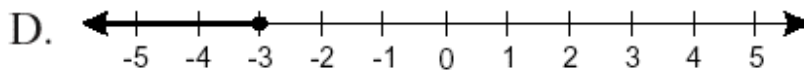
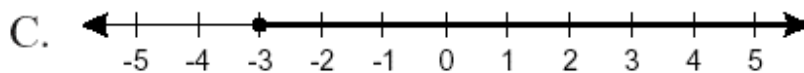
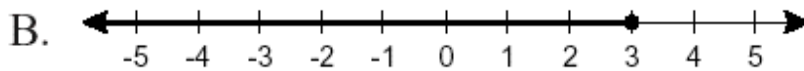
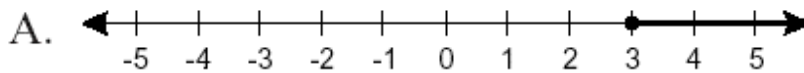
- A)  $3x + 2y = 6$   
B)  $3x - 2y = 6$   
C)  $2x + 3y = 6$   
D)  $2x - 3y = 6$



3. If  $4 + 2(3x - 4) = 8$ , then  $3x - 4$  equals

- A) 4    B) 2    C) 8    D) 6

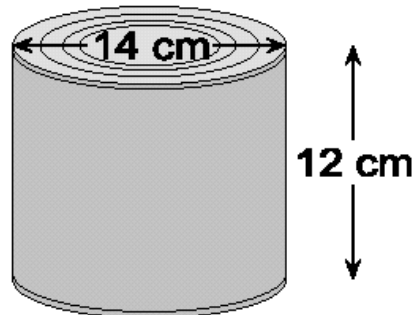
4. Which graph represents the solution set for the inequality  $5 - x \leq 8$ ?



5.  $\frac{3\pi}{4}$  radian is equal to

- A)  $150^\circ$     B)  $145^\circ$     C)  $135^\circ$     D)  $75^\circ$

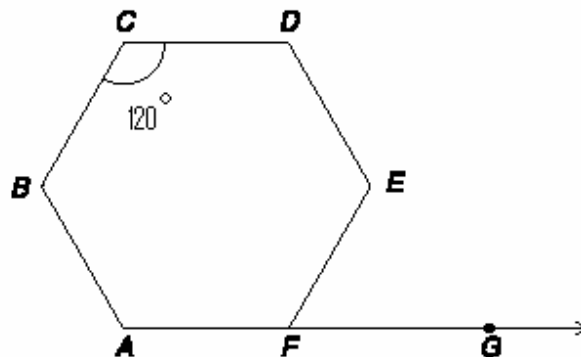
6. A Bosaso company is determining the cost of labels for new cans with the dimensions shown below.



The label for each can will wrap around the side of the can with no overlap. What is the approximate area of one label?

- A) 1847 cm<sup>2</sup>    B) 264 cm<sup>2</sup>    C) 528 cm<sup>2</sup>    D) 924 cm<sup>2</sup>

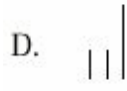
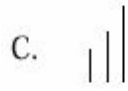
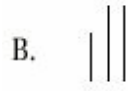
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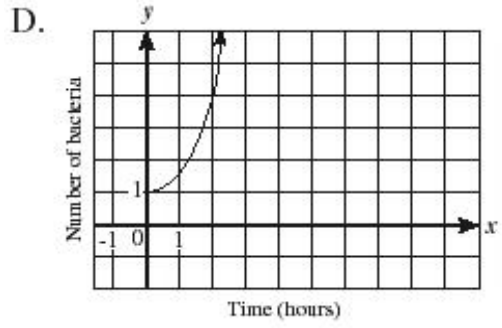
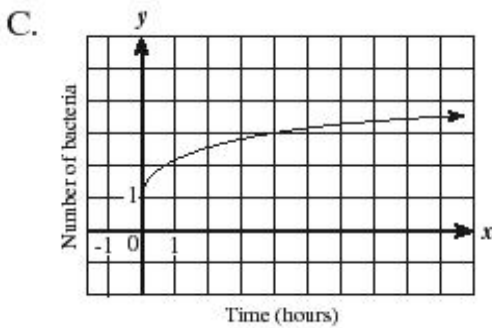
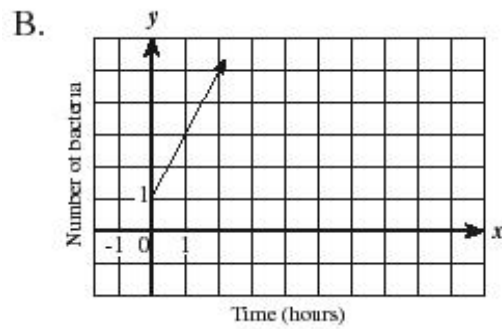
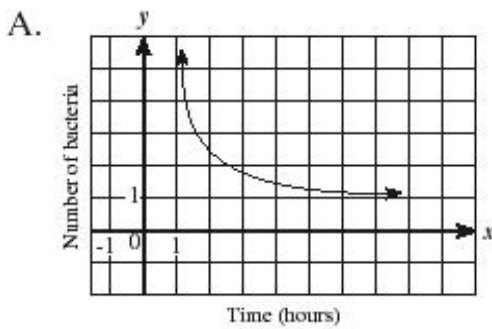
In the regular hexagon above, how many degrees are in angle EFG?

- A) 80°    B) 240°    C) 60°    D) 120°

8. Which set of line segments **cannot** be used to form a triangle?



9. The number of bacteria in a culture doubles each hour. Which graph below **best** represents this situation?



10. If a letter is selected at random from the word 'MISSISSIPPI,' find the probability that it is an 'S.'

A)  $\frac{1}{8}$

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

C)  $\frac{3}{11}$

D)  $\frac{4}{11}$

**ANSWER ALL QUESTIONS. Each Question carries 9 marks**

**QUESTION 1**

The ages of children attending madras in a certain area in Burtinle are shown below.

Class	Frequency ( $f$ )	Mid-points( $x$ )	$fx$
2-4	3	3	
5-7	8		
8-10	12		
11-13	10		120
14-16	2		
	$\Sigma f =$		$\Sigma fx =$

a) Complete the table

(4 Marks)

b) State the modal class

.....  
 .....

(2 Marks)

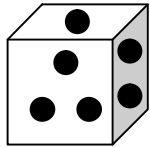
c) Calculate the mean age of the children attending the madras.

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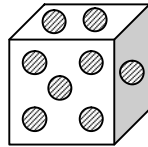
(3 Marks)

**QUESTION TWO**

Two dice are rolled. The sum of the dice is recorded in the following table.



Dice 1



Dice 2

+	1	2	3	4	5	6
1	2					
2				6		
3						
4			7			
5						
6						

a) Fill in the missing values in the table. ( 2 Marks)

b) Find the probability of getting

i) a sum of 7

.....  
 .....

( 1 Marks)

ii) a sum greater than 8

.....  
 .....

( 2 Marks)

iii) a sum less than or equal to 5

.....  
 .....

( 2 Marks)

iv) a sum that is an odd number.

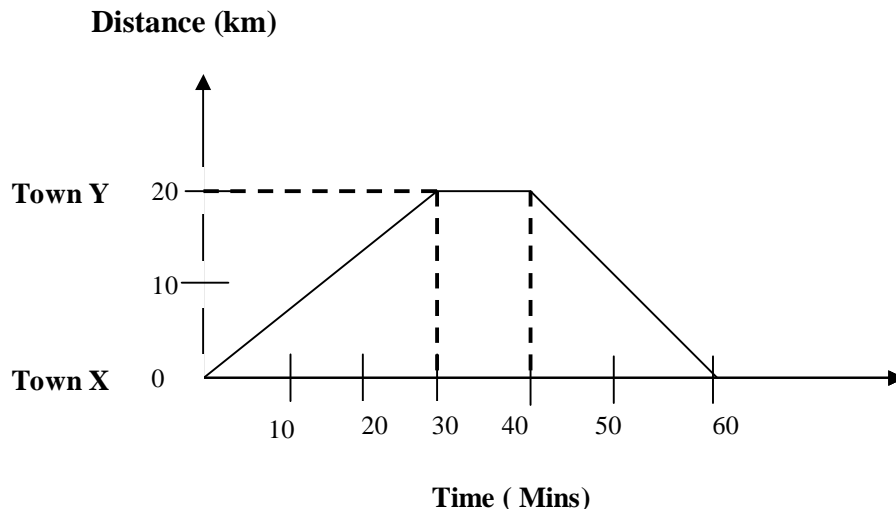
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( 2 Marks)



### QUESTION THREE

The graph shows a taxi traveling from town X to town Y to hand over some package and then returning to town X.



- a) What was his speed in km/h  
i) on the outward journey

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

( 2 Marks)

- ii) on the return journey

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( 2 Marks)

- b) Calculate  
i) the total distance traveled by the taxi

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

( 2 Marks)

ii) the average speed in km/h of the whole journey

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( 2 Marks)

**QUESTION FOUR**

Given that A is the point (2,3), B is the point (6,6), calculate

a) the coordinates of the midpoint of AB

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( 2 Marks)

b) the length of the line AB

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( 2 Marks)

c) the gradient of the line AB

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( 2 Marks)

d) the equation of the line AB

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( 3 Marks)

**QUESTION FIVE**

The velocity of an object moving in a straight path after  $t$  seconds is given by  $V(t) = 8t - t^2 - 7$  m/s. Calculate

- a) the velocity when  $t = 2$

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( 2 Marks)

- b) the acceleration of the object after 3 seconds

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.....

( 3 Marks)

- c) the distance covered by the object between  $t = 3$  seconds and  $t = 6$  seconds

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( 4 Marks)

**QUESTION SIX**

- a) Given the matrices  $A = \begin{pmatrix} 2 & 1 \\ 0 & 3 \end{pmatrix}$  and  $B = \begin{pmatrix} 3 & 2 \\ 5 & 1 \end{pmatrix}$  find:

- i)  $4A - B$

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( 2 Marks)

iii)  $(B^{-1})$ , the inverse of B.

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( 3 Marks)

b). Look at the following sequence: 4, 12, 36, 108, .....

Find

i) the common ratio

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( 2 Marks)

ii) the 10th term

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( 2 Marks)

**QUESTION SEVEN**

a) Given that  $g(x) = bx + 2$  and  $g(-2) = 3$ , find the value of b.

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( 2 Marks)

b) If  $f(x) = 9x - 6$ , find  $f^{-1}$ . hence evaluate  $f^{-1}(3)$

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( 4 Marks)

c) Find  $fg(2)$

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( 3 Marks)

**QUESTION EIGHT**

a) Prove the identity  $\cot \theta + \tan \theta \equiv \sec \theta \operatorname{cosec} \theta$

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( 4 Marks)

b) Prove the identity  $\frac{\sin A}{1 + \cos A} + \frac{1 + \cos A}{\sin A} = \frac{2}{\sin A}$

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( 5 Marks)

**QUESTION NINE**

a) Given that  $a = \begin{pmatrix} 2 \\ 5 \end{pmatrix}$  and  $b = \begin{pmatrix} 3 \\ 7 \end{pmatrix}$ , find:

i)  $3a + 2b$

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.....  
.....( 3 Marks)

ii) the  $|2a - b|$  i.e. { modulus of  $2a - b$  }

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.....( 3 Marks)

b) Make  $q$  the subject of the formula:  $p = \frac{q+r}{q-r}$

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.....( 3 Marks)

**QUESTION TEN**

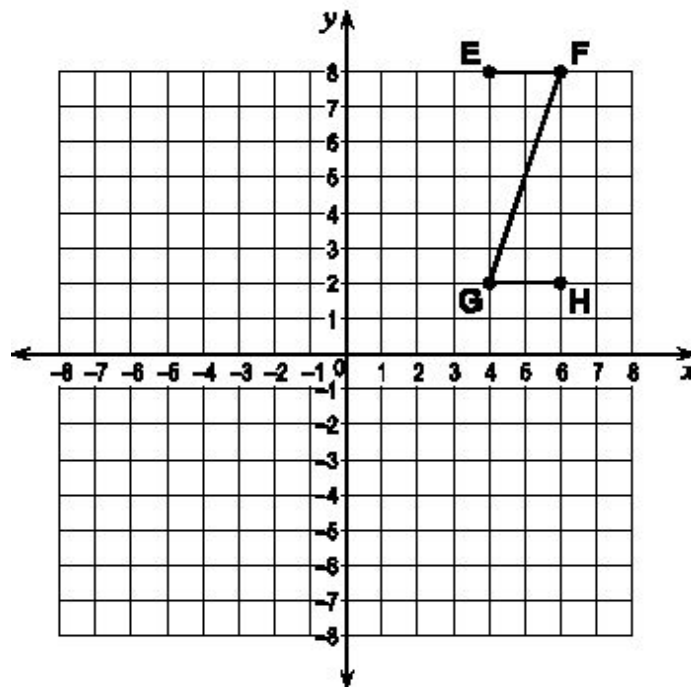
a) Simplify  $\frac{-3 \div (-12) \times 4 - (-20)}{-6 \times 6 \div 3 + (-6)}$

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.....( 3 marks)

b) Find the value of X in the equation:  $2 \log_{10} x + \log_{10} 6 = 1 + \log_{10} 15$

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..... ( 3 marks)

c) If the figure EFGH is translated 10 units down, what are the new coordinates of the image of point F?



( 3 marks)

END