**MINISTRY OF EDUCATION**

**RUHANGO DISTRICT**

**MATHEMATICS EXAM OF THE THIRD TERM 2021 FOR S3**

**DURATION: 3 Hours**

**INSTRUCTIONS:**

1. This paper has **TWO**sections: **A** and **B**

**SECTION A:** Attempt **ALL** questions **(55 MARKS)**

**SECTION B:** Attempt **ANY THREE** questions **(45MARKS)**

1. **Use of non-programmable calculators is** allowed.
2. Use only **a blue or black ink pen** to write your answers
3. Show clearly all the working steps. Marks will **not be awarded for the answer without all working steps.**

**SECTION A (ANSWER ALL QUESTIONS)**

1. Without using calculator, evaluate:

**/3marks**

1. a) Find the ratio given that

b) Find the integral values of which satisfy the simultaneous inequalities

**/4marks**

1. Simplify  Leaving your answer in surds with rational

denominator. **/3marks**

1. Solve the following system of two equations using the graphical method:

**/3marks**

1. Find the solution set for
2. If is a prime number
3. If is an even integer.**/4marks**
4. Evaluate the following giving your answer in the base five.

**/3marks**

1. 100 000 RWF was invested. The simple interest after two years was 16 000 RWF. Find the annually rate**/3marks**
2. Given that and are proportional to 6 and 4 and that. Determine the values of and. **/4marks**
3. Consider the polynomial
4. Calculate.

Divide by **/5marks**

1. Given the vectors , and . Find:
2. Find the coordinates of if abcd is a parallelogram and sketch the parallelogram

abcd in XY-plane. **/6marks**

1. Find the distance between two points nearest tenth**/3mks**
2. Given that A, B and C
3. Find the equation of the straight line passing through points A and B.
4. Find the coordinates of point D if ABDC is a parallelogram.
5. Draw the parallelogram ABDC in Cartesian plane. **/6marks**

13. Show that the points A (0, –**2**), B(2, **4**) and C (–1, –5) are collinear**/3marks**

14. Calculate and simplify:**/3marks**

15. Without using calculator,evaluate:**/2marks**

**SECTION B (CHOOSE ONLY THREE QUESTIONS)**

1. The figure below shows the marks in percentage obtained by candidates in an English test

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 72 | 70 | 66 | 74 | 81 | 70 | 74 | 53 | 57 | 62 |
| 58 | 92 | 74 | 67 | 62 | 91 | 73 | 68 | 65 | 80 |
| 78 | 67 | 75 | 80 | 84 | 61 | 72 | 72 | 69 | 70 |
| 76 | 74 | 65 | 84 | 79 | 80 | 76 | 72 | 68 | 63 |
| 82 | 79 | 71 | 86 | 77 | 69 | 72 | 56 | 70 | 67 |
| 76 | 56 | 86 | 63 | 73 | 70 | 75 | 73 | 81 | 64 |

1. By arranging the data in classes of 50-54, 55-59, etc make frequency table.
2. Using your grouped data, calculate the mean and the median **/15marks**
3. Given that , and
4. Draw the triangle on a Cartesian plane.
5. The image of by the translation is . Find the coordinates of and the images respectively of and by the same translation and draw triangle in the same Cartesian plane.
6. The image of by reflection is

Determine the coordinates of and images of and respectively by the same reflection.

1. Indicate the equation of the line of reflection and draw the triangle in the same Cartesian plane.

Let the rotation of Centre, origin of axes, angle. Find the coordinates of and image respectively of and by this rotation. Draw the triangle in the same Cartesian plane**/15marks**

1. Given the polynomial function
2. Find the quotient and the remainder of the division of by
3. Factorise completely.
4. solve the equation **/15marks**
5. a)In a school, students must take at least one of these subjects: Math, Physics and Chemistry. In a group of 50 students, 7 take all three subjects, 9 take Physics and Chemistry only, 8 take Math and Physics only and 5 take Math and Chemistry only. Of these 50 students take Maths only, take Physics only and take Chemistry only. Draw the Venn diagram, find , and hence find the number taking Maths.

b)A student of S3 deposited on his account an amount of 15000frw on a compound interest rate of 5% per annum (per year). Find his accumulated amount after 3 years.**/15marks**

1. a)Calculate the values of and if the polynomial has as the root and also is a factor of

b) Factorize completely

c)Deduce the roots of the equation **/15marks**

**Good Luck !!!!!!!!!!!!!!!!!!!!**

**MARKING GUIDE OF MATH DISTRICT EXAM S3 (TERM THREE, 2021)**

1. **(2mark)**

**(1mark)**

1. a)



 **(2mark)**

b) 

On the line number line



The integral values of x are: 2,3,4 and 5. **(2mark)**

 **(2mark)**

 **(1mark)**

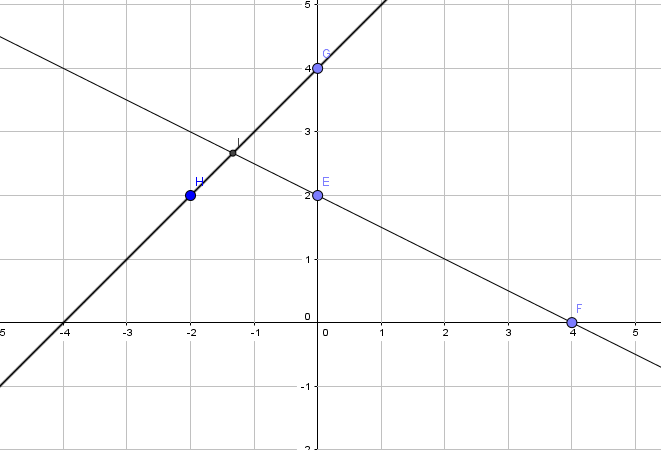
1. For

|  |  |  |
| --- | --- | --- |
| x | 0 | 4 |
| y | 2 | 0 |

**(1mark)**

|  |  |  |
| --- | --- | --- |
| x | 0 | -2 |
| y | 4 | 2 |

**(1mark)**



S= **(2mark)**

1. and and and **(2mark)** a) The prime numbers between and 11 are 3 , 5 , 7 , 11. **(1mark)** b) Even integers between and 11 are 4 , 6 , 8 , 10 **(1mark)**
2. **(0.5mark)** **(0.5mark)**  **(0.5mark)**

In base ten, **(0.5mark)**

831 5 remainder

166 1

33 1

6 3

1 1

0 1

**(1mark)**

1. **(1mark)**  **(1mark)**

The annually rate is 8% **(1mark)**

1. and **(1mark)**

**(2mark)**

**(1mark)**

2. **(1mark)**

**(1mark)**

**(1mark)**

1. Use synthetic division:

**(2mark)**

 **(1mark)**

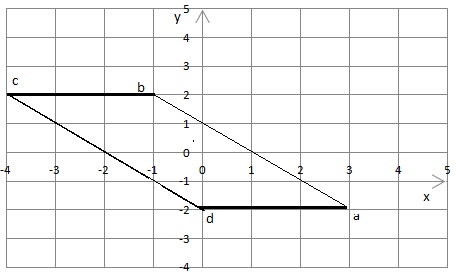
 **(1mark)**

 **(1mark)**

b) abcd is a parallelogram then  where 



 **(1mark)**

 **(2mark)**

1.  **(3mark)**
2. **(1mark)**







 **(1mark)**

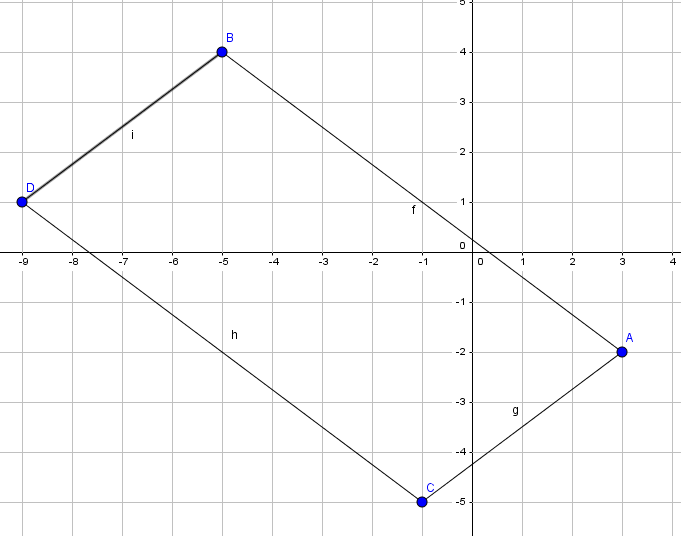




 **(1mark)**



    **(1mark)**

**(2mark)**

 **(1mark)**

  **(2mark)**

Therefore, the given points are collinear

**(2mark)**

**(1mark)**

1. **(1mark)**

. **(1mark)**

**SECTION B**

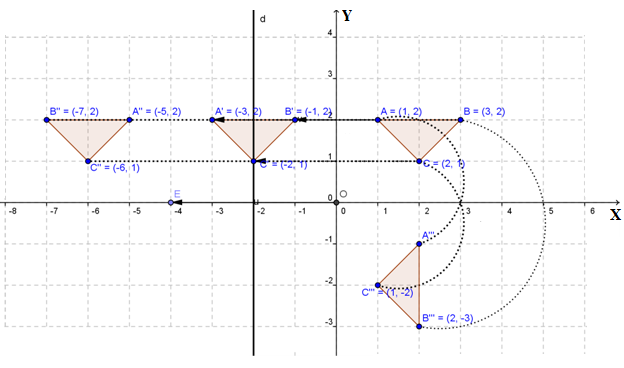
|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Classes** | **f** | **x** | **Fx** | **CF** |
| 50-54 | 1 | 52 | 52 | 1 |
| 55-59 | 4 | 57 | 228 | 5 |
| 60-64 | 6 | 62 | 372 | 11 |
| 65-69 | 10 | 67 | 670 | 21 |
| 70-74 | 18 | 72 | 1296 | 39 |
| 75-79 | 9 | 77 | 693 | 48 |
| 80-84 | 7 | 82 | 574 | 55 |
| 90-94 | 3 | 87 | 261 | 58 |
| 95-99 | 2 | 92 | 184 | 60 |

**(Two marks for each column i.e. 10mark for the table)**

**(2mark)**

**(1mark)**

The median is 72**. (2mark)**



**(1.5 marks for each triangle, 2marks a line d i.e. 8marks for whale diagram)** b) Vector of translation is **(1mark)**

Coordinates of B’: **(1mark)**

Coordinates of C’: **(1mark)**

c) i) Under reflection coordinates of A’’ are (-5,2) and coordinates of C’’ are (-6,1)

ii) The line of reflection is given by

The equation of the line is **(1mark)**

d) Under a rotation of about the origin

**(1mark)**

**(1mark)**

**(1mark)**

1. a) i) divides by using long division.

**(5marks)**

0

The quotient

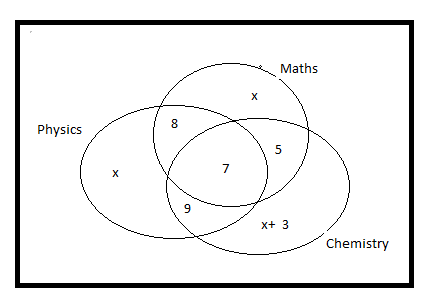
The remainder R = 0

ii) **(1mark)** **(1mark)** **(1mark)** **(1mark)**

iii) **(1mark)**

**( 1mark for each value I.e. 3maks)**

1. a)

**(7mark)**

 **(2mark)**

The number of students taking Maths is  **(1mark)**

b) . **(2mark)**

P =15000F, R =5%, T =3 years **(1mark)**

A = 15000

A = 17,364,375 frw **(1mark)**

The accumulated amount of student after 3 years is 17,364,375 frws.

**(1mark)**



is a factor of , **(3mark)**

then

**(3mark)**

and gives : **(3mark)**

, .

and

b)

**(3mark)**

C)

**(3mark)**