**Mathematics**

**…../……./2021**

**8h30 am -11h30am**



**SENIOR TWO ENDS OF YEAR EXAMINATIONS, 202021**

**SUBJECT: MATHEMATICS**

|  |
| --- |
| **/100**    **Marks:** |

**DURATION: 3 HOURS**

**INSTRUCTIONS:**

1. Do not open this question paper until you are told to do so.
2. Answer all questions: **100 marks**

5) Use only a **blue** or **black** pen.

**S2MATH COMPREHENSIVE,2020**

1) Simplify  (4marks)

2)Solve the equation y4 = 81. (5marks)

3) Rationalize the following

a)  (4marks)

b)  (6marks)

4) a) If  find the value of

 (4marks)

1. If P(x) and Q(x) are polynomials such that  and 

Find  and simplify completely (6marks)

5) Solve the following system by substitution (10marks)



6)The sum of two numbers is 20. The larger number is four less than twice the smaller number. What are the two numbers? (10marks)

7) a)A man salary last year was 150 000 FRW. This year it was increased by 20%. What is her salary this year? (6marks)

b) Find the midpoint of the points A (3, 8) and B (-9, 2). (4marks)

8) Suppose that 14, b, c is a Pythagorean triple. Find the value of b and c. (10marks)

9) )If  and  are two vectors such that  and 

Workout the following:

i)  (4marks)

ii)  (4marks)

iii) Magnitude ofor  (4marks)

10) The table below shows the distribution of results obtained by S2 Students in a Math Test out of 20

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 14 | 15 | 16 | 17 | 15 | 16 |
| 16 | 17 | 18 | 17 | 17 | 17 |
| 17 | 17 | 17 |  |  |  |

a)Complete the frequency table below:(10marks)

|  |  |  |
| --- | --- | --- |
| Marks , | Frequency , |  |
| 14 | 1 |  |
|  |  |  |
|  |  |  |
|  |  |  |
| 18 | 1 |  |
|  |  |  |

b) Calculate the mean marks (3marks)

c) Determine the mode result of the distribution and explain your answer (2marks)

d)what is the highest result (1mark)

e) What is the lowest result? (1mark)

f) How many students did they pass the test (2mark)

**S2 MATHEMATICS COMPREHENSIVE 2020 MARKING SCHEME**

Answer 1 4marks

12x4y5 ÷ 3x3y2 = 12x4y5 3x3y2

= 4x4y5 x3y2 (Dividing the coefficients by 3)

= 4xy5 y2 (Dividing by x3)

= 4xy3 (Dividing by y2)



Answer 2 5marks

RHS = 81

= 34

LHS = y4

∴ y4 = 34

Since indices are the same, then the bases must be equal.

∴ y = 3

Since the power 4 is even, then y could also be equal to the addition inverse of 3, i.e. –3

answer 3

1. 4marks







b) 6marks



=

=

=

=

Answer 4 a 4marks

(x + y)(3x – 4z) = 

= (1)(9 – 20)

= 1 × (–11)

= –11

(b) 6marks

(6x – y + 3z) – (2x + 5y – 4z)

= 6x – y + 3z – 2x – 5y + 4z

= 6x – 2x – y – 5y + 3z + 4z

= 4x – 6y + 7z

Answer 5 10marks

Consider the following equations

3x – 5y = 23.............(1)

x – 4y = 3..............(2)

Using equation (2), add 4y to both sides:

x + 4y = 3

x – 4y + 4y = 3 + 4y

x = 3 + 4y..............(3)

In equation (3), x is said to be expressed or solved in terms of y.

To express the equation 3x – 5y = 23 as an equation in one variable, substitute (3 + 4y) in place of x in equation (1):

3x – 5y = 23 becomes

3(3 + 4y) – 5y = 23

9 + 12y – 5y = 23

9 + 7y = 23

7y = 14

y = 2

Substituting y = 2 in equation (3) we get;

x = 3 + 4(2)

= 3 + 8

∴ x = 11

Answer 6 10marks

Let x and y be the two numbers such that x is larger than y. The statement "the larger number is four less than twice the smaller number" may be formulated by   
  
x = 2y - 4

We use the sum of the two numbers to write a second equation.   
  
x + y = 20

Substitute x by 2y - 4 in x + y = 20 to obtain   
2y - 4 + y = 20

Solve for y to find   
  
y = 8 and x = 2y - 4 = 12

Solution 7a 6marks

The salary increase was 20 100 of

150 000 FRW

= (150 000 x20):100

= 30 000 FRW

The new salary

= 150 000 FRW + 30 000 FRW

= 180 000 FRW

Solution 7b 4marks

Let the midpoint be P;











Answer 8 10marks

Using 1/2 (14)2= 1/2 (196)

= 98

b + c = 98...(i)

But c > b that is c = b + 2 ...(ii)

Substituting equation (ii) in (i)

b + b + 2 = 98

2b = 96

b = 48 and c = b + 2

= 48 + 2

= 50

Now we want to verify that

a2 + b2 = c2

LHS 142 + 482 = 196 + 2304

= 2500

RHS 502 = 2500

LHS = RHS

Therefore, 14, 48, 50 is a Pythagorean triple.

answer 9 ( 10marks)

i) 4marks



ii) 4marks



iii) 4marks



ANSWER 10

a)Complete the frequency table below (10marks)

|  |  |  |
| --- | --- | --- |
| Marks , | Frequancy , |  |
| 14 | 1 | 14 |
| 15 | 2 | 30 |
| 16 | 3 | 48 |
| 17 | 8 | 136 |
| 18 | 1 | 18 |
|  | 15 | 246 |

b)the mean marks =  3marks



c)the mode result is 17 because it has the highest frequency “8” 2marks

d) the highest result is 18 1mark

e) the lowest result is 14 1mark

f) 15 students passed the test . 2marks