IPRC NGOMA
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Module Detail		Trainee's Detail		
SECTOR:	ICT	**Reg No:**		
SUB-SECTOR:	Information Technology	**Class:**	Level 6 Information Technology	
		Trainer's Detail		
CERTIFICATE:	TVET Diploma	**Name:**	HAKIZIMANA Thacien	
MODULE (Code &Title):	GENFM601: Fundamental Engineering Mathematics	**Additional info**		
Competence:	Apply fundamental Engineering Mathematics	**Duration:**		
		Due date:	31st March, 2022	
Training Centre:	IPRC Ngoma	**Signature:**		
Scored marks:	**40**	**Decision:**	**Competent**	
			Not Yet Competent	

Assignment Unit 1

Learning Outcomes:

1.1 Solve real life problems involving sets

1.2. Demonstrate elementary functions and function operations

1.3. Solve word problems involving elementary functions

Instructions: Attempt all questions in groups

Group Members No:

#	Names	Student Reg No	Signature
1			
2			
3			
4			
5			
6			
7			

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Question 1:

In a fruit feast among **200** students, **88** chose to eat **apples**, **73** ate **mangoes**, and **46** ate **oranges**. **34** of them had eaten both apples and mangoes, **16** had eaten apples and oranges, and **12** had eaten mangoes and oranges, while **5** had eaten all 3 fruits. Determine:

i) How many of the **200** students ate none of the **3** fruits?

ii) How many ate only mangoes?

iii) How many students ate only one of the fruit feast?

iv) How many students ate at least one fruit of the fruit feast?

v) How many students ate at least two fruits of the fruit feast?

vi) How many students ate at most two fruits of the fruit feast?

Question 2:

Given that $f(x) = \frac{2x-1}{3x+4}$, $g(x) = \frac{1}{3x^2}$ and $h(x) = \frac{3}{x}$

Find the following values:

$a)\ f(2)$

$b)\ g(3)$

$c)\ h(5)$

$d)\ h(2) + g(2)$

$e)\ \left(h/g\right)(5)$

$f)\ (h \cdot g)(2)$

$g)\ h(g(2))$

$h)\ h(h(3))$

Question 3:

Consider the universal set U of the sets $A = \{x \in \mathbb{Z}: |2x - 2| > 4\}$ *and* $B = \{\, x \in \mathbb{N}: |2 - 2x| \leq 6 \,\}$

Find explicitly the elements of the sets:

$i)\ A \cap B$ $ii)\ A \cup B$ $iii)\ \bar{A} \cap \bar{B}$ $iv)\ \bar{A} \cup \bar{B}$

Question 4:

i) In Cartesian plane, plot $y = -x^2 + 2x + 3$ (use 1 cm as unit)

ii) Find the equation of the line D_1 that satisfies the following conditions:

a) D_1 passes through $A(-1, 0)$ and $B(0, 5)$

b) D_1 has gradient 4 and passes through $(3, 4)$

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Question 5: **Solve in R**

i) $log_x(x+6) + log_x(x-1) = log_x 2 + 2$
ii) $log_9 x + log_{x^2} 3 = 1$
iii) $ln(x^2 + 2x + 1) > ln(3 + x - x^2)$
iv) $\log^2 x - logx^4 = 5$
v) $\log_4(6-x) = \log_2 x$
vi) $\log_2 x - \log_x 8 = 2$

Question 6: **Solve in R**

i) $9^x.\left(\frac{1}{3}\right)^{1-x} = 27.(3^x)^{-2}$

ii) $2^{x+3} + 4^{x+1} = 320$

iii) $6^{3x+1} = 7^{2-x}$

iv) $10^{x-2} = 0.0001$

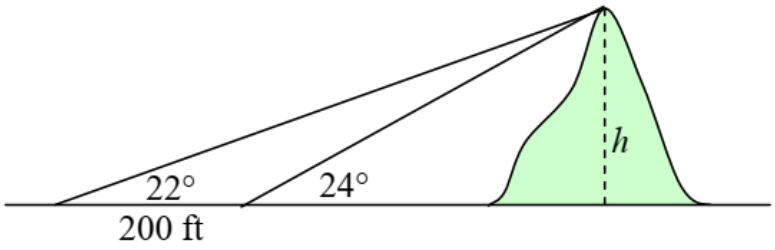
v) $\left(\frac{1}{8}\right)^{-x^2+4x} = \left(\frac{1}{64}\right)^2$

vi) $(0.125)^{x-8} \geq \left(\frac{1}{64}\right)^x$

Question 7:

To measure the height of a hill, a woman measures the angle of elevation to the top of the hill to be 24 degrees. She then moves back 200 feet and measures the angle of elevation to be 22 degrees. Find the height of the hill.

As with many problems of this nature, it will be helpful to draw a picture.



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Question 8:

A person on an airplane looks down at a point on the ground at an angle of depression of 15°. The plane is flying at an altitude of 10,000 feet. How far is the person from the point on the ground to the nearest foot?