MATHEMATICS HOMEWORK FOR 5 ACC

<u>**Section A: Attempt all questions (55 marks)**</u>

1. Define a rational number **(3 marks)**

2. Given a set of numbers with the following elements **(4 marks)**

$$\left\{-4.27, \frac{-2}{3}, \frac{1}{6}, \pi, 1.3, \sqrt{2}, -3, 100, 7, -\sqrt{9}\right\}$$

assign numbers in the following sets of numbers

a.) $\mathbb{N}$,
b) $\mathbb{Z}$,
c) $\mathbb{Q}$,
d) $\mathbb{R}$

3. Find $P(-2)$ where $P(x) = -2x^3 + 3x - 5$ **(4 marks)**

4. Solve in $\mathbb{R}$ $x^2 + 2x - 24 = 0$ **(5 marks)**

5. Find the range of solutions that satisfies $x > 2x - 4$ **(4 marks)**

6. Suppose your cell phone plan is 3000 Frw per month plus 20 Frw per minute. Your bill is 7 000 Frw. Use the equation $3000 + 20x = 7000$, to find out how many minutes are on your bill. **(3 marks)**

7. State the domain of definition of any exponential function **(3 marks)**

8. Write the inverse of $b = \log_{\frac{1}{2}}^{a}$ **(3 marks)**

9. Solve $\log_3 x + 3 = \log_3 4$ **(3 marks)**

10. Evaluate $\lim\limits_{x \to -\infty} e^{\frac{6x^2 + x}{5 + 3x}}$ **(4 marks)**

11. Evaluate the following limit: $\lim\limits_{x \to +\infty} \frac{\sqrt{4x^2 - 11x - 3}}{x}$ **(5 marks)**

12. Given the formulas $(1 + ni)P$ and $(1 + i)^n P$, which is the formulae of:

   a) Simple interest **(2 marks)**

   b) compound interest **(2 marks)**

13. The bank charges interest at a rate of 9% per year, calculate monthly interest rate. **(3 marks)**

14. If the monthly rate of interest on a loan is 1.75%, what is the corresponding Annual Percentage Rate (APR)? **(4 marks)**

10. Differentiate he following function

   a) $y = 15x^{100} - 3x^{12} + 5x - 46$
   b) $g(x) = 3\sec(x) - 10\cot(x)$

Section B: Attempt three questions (45 marks)

16. In a competition about taxpayers, an institution in charge awarded different categories of taxpayers, 36 medals in rental income tax payers, 12 medal in taxes on property and 18 in taxes on goods and services. If these medals went to a total of 45 persons and only 4 persons got medals in all the three categories, how many received medals in exactly two of these categories? **(15 marks)**

17. A manufacturer develops a formula to determine the demand for its product depending on the price in Rwandan franc. The formula is $D = 2000 + 100P - 6P^2$, where P is the price per unit, and D is the number of units in demand. At what price will the demand drop to 1000 units? **(15 marks)**

18. Using logarithm, solve the following equation $2^{-2x+4} = \left(\frac{1}{4}\right)^{2x+1}$ **(15 marks)**

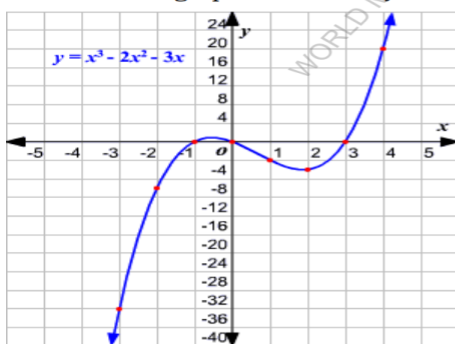19. Let $f(x) = \frac{x^2 + 2x - 3}{x}$, Find relative asymptotes of $f(x)$ **(15 marks)**

20. Suppose that 50 000 FRW is invested in a bank at annual interest rate of 8%. Find the total amount(principal and interest) at the end of three years in each of the following cases:
a) The interest is charged only on the money initially invested. **(5 marks)**
b) The interest is added to the principal at the end of each year to make a new principal for the following year. **(5 marks)**
c) What are your observations as future Accountant Technicians? **(5 marks)**

21.

09. Given the graph of function $y = x^3 - 2x^2 - 3x$ **(4marks)**

a) find the domain of the above graph
b) find the intercepts
c) with your observation, indicate turning points