2025 SHS1 END OF SEMESTER EXAM ADDITIONAL MATHEMATICS 2
DURATION: 1 HOURS 45 MINUTES
THEORY (PART 1)

Answer **ALL** Questions from this section **[25 MARKS]**

1. Solve the simultaneous equations;
   $\log(x-1) + 2\log y = 2\log 3$,
   $\log x + \log y = \log 6$.

2. The 13th term of an arithmetic progression is 10 and the 25th term is 20. Calculate:
   (i) the common difference
   (ii) the first term.
   (iii) the 17th term

3. Two functions *f* and *g* are defined on the set of real numbers by *f*: $x \to 6x - 3$ and *g*: $x \to \frac{2x-3}{x-3}$, $x \neq 3$
   Find: (i) $gof(x)$ (ii) $fog(x)$ (iii) g^{-1}

PART 2
[45 MARKS]

INSRUCTIONS: ANSWER ANY **THREE (3)** QUESTIONS FROM THIS SECTION

4. Every time a frog jumps forward the distance covered is half of the previous jump. If the frog initially jumped 70 cm, calculate
   (i) To the nearest two decimal places distance of the sixth jump.
   (ii) The total distance covered after the sixth jump.
   (iii) Given the sequence with the rule : $U_{n+1} = 2U_n \; and \; U_1 = 3$, generate U_2, U_3, U_4 .

5. A function f defined on the set $\mathbb{R}$, of real numbers, is given by $f: x \to \frac{2x+1}{3x-1}$, x $\neq \frac{1}{3}$.
   (i) Show that *f* is a one – to – one function
   (ii) Find the inverse f^{-1} of *f*.

6. The second and the fifth terms of Geometric Progression (G.P) are 1 and $\frac{1}{8}$ respectively. Find the:
   (i) Common ratio
   (ii) First term
   (iii) Eighth term

7. A local electronics store is selling a new smartphone model. The store manager has recorded the number of smartphones sold and the corresponding price for each week. The data is as follows:
   Week 1: Price *GH¢* 800.00, Number of Smartphones Sold: 30
   Week 2: Price *GH¢* 700.00, Number of Smartphones Sold: 40
   Week 3: Price *GH¢* 600.00, Number of Smartphones Sold: 50
   Week 4: Price *GH¢* 500.00, Number of Smartphones Sold: 60
   Construct a linear function that represents the relationship between the price (*p*) and the number of smartphones sold (*n*) and predict the number of smartphones that would be sold if the price is reduced to *GH¢* 200.00.

8. Using the graphical method, solve the simultaneous equation: $y = x^2 - x - 6, where -4 \leq x \leq 5$ and $y = x + 2, where -3 \leq x \leq 4$

9. (a) Divide $x^4 + x^3 - 11x^2 - 5x + 30$ by $x - 2$
   (b) Solve by completing the square, $x^2 + 6x + 2 = 0$