

**DIFFERENTIATION & APPLICATIONS (Q 6 & 7, PAPER 1)**

**LESSON NO. 11: RATIONAL FUNCTIONS**

**2005**

6 (c) The equation of a curve is  $y = \frac{x}{x-1}$ , where  $x \neq 1$ .

- (i) Show that the curve has no local maximum or local minimum point.
- (ii) Write down the equations of the asymptotes and hence sketch the curve.
- (iii) Show that the curve is its own image under the symmetry in the point of intersection of the asymptotes.

**2003**

6 (c) The function  $f(x) = \frac{1}{1-x}$  is defined for  $x \in \mathbf{R} \setminus \{1\}$ .

- (i) Prove that the graph of  $f$  has no turning points and no points of inflection.
- (ii) Write down the reason that justifies the statement: “ $f$  is increasing at every value of  $x \in \mathbf{R} \setminus \{1\}$ .”
- (iii) Given that  $y = x + k$  is a tangent to the graph of  $f$  where  $k$  is a real number, find the two possible values of  $k$ .

**ANSWERS**

**2005** 6 (c) (ii)  $x = 1, y = 1$

**2003** 6 (c) (iii)  $k = -3, 1$