

FINDING UNKNOWN WHEN LIMIT IS GIVEN

Ex. $f(x) = \begin{cases} a + bx, & x < 1 \\ 4 & x = 1 \\ b - ax & x > 1 \end{cases}; \lim_{x \rightarrow 1} f(x) = f(1). a \& b = ?$

Sol.: [LHL($x = 1$) = RHL($x = 1$) = $f(1) = 4$]

$$\text{LHL: } \lim_{x \rightarrow 1^-} f(x) = \lim_{x \rightarrow 1^-} a + bx = a + b = 4 \dots (1)$$

$$\text{RHL: } \lim_{x \rightarrow 1^+} f(x) = \lim_{x \rightarrow 1^+} b - ax = b - a = 4 \dots (2)$$

$$(1) + (2) \Rightarrow a + b + b - a = 4 + 4$$

$$2b = 8 \Rightarrow b = 4$$

$$a = 0$$