Que 28

$$f(x) = \begin{cases} a+bx & x<1 \\ 4 & x=1 \\ b-ax & x>1 \end{cases}$$

$x<1$ — L.H.L

and $\lim_{x\to 1} f(x) = f(1)$

$x>1$ — R.H.L

$\boxed{f(x) = 4}$

L.H.L.

$\lim_{x\to 1^-} a+bx \Rightarrow a+b\times 1 = \boxed{a+b}$

$\lim_{x\to 1^+} b-ax = \boxed{b-a}$

$\boxed{\cancel{a}+b=4}$

$b-\cancel{a}=4$

adding

$2b = 8$

$\boxed{a=0}$ Ans

$\boxed{b=4}$ Ans

Que 29.

$f(x) = (x-a_1)(x-a_2)\ldots(x-a_n)$

$\lim_{x\to a_1} (a_1-a_1)(a_1-a_2)\ldots(a_1-a_n)$

$0 \times [(a_1-a_2)\ldots(a_1-a_n)] = 0$

$\lim_{x\to a} (x-a_1)(x-a_2)\ldots(x-a_n)$

$(a-a_1)(a-a_2)\ldots(a-a_n)$

Qu 30

$$f(x) = \begin{cases} |x|+1 & x<0 \quad \text{LHL} \\ 0 & x=0 \quad f(x) \\ |x|-1 & x>0 \quad \text{RHL} \end{cases}$$

at $x=0$ limit does not exist.

But $\lim_{x \to a} f(x)$ $a \neq 0$ $a > 0$

$x = a$ $a > 0$

$|-1| + 1 = |+1| = 2$

$|\cancel{+}| = 0$

(31)

$\lim_{x \to 1}$

Que32 $f(x) = \begin{cases} mx^2 + n & x < 0 \\ nx + m & 0 \leq x \leq 1 \\ nx^3 + m & x > 1 \end{cases}$

L.H.L.

$\lim_{x \to 0^-} f(x) = (mn^2 + n) = 0 + n = n$

R.H.L. $\lim_{x \to 0^+} f(x) = nx + m = 0 + m = m.$

$\lim_{x \to 1} nx + m = n \times 1 + m = n + m$

$\lim_{x \to 1} nx^3 + m = n + m$

$x = 1$ exist.

15. $\lim_{x \to 0} \dfrac{\sqrt{x+25} - 5}{x}$

16. $\lim_{x \to 0} \dfrac{4^x - 1}{8^x - 1}$

17. $\lim_{x \to 4} \dfrac{\sqrt{x} - 2}{x - 4}$

18. $\lim_{x \to 1} \dfrac{x^5 - 1}{x - 1}$

19–22 ■ Evaluate the limit by simplifying the fraction.

19. $\lim_{x \to 0} \dfrac{(x+5)^2 - 25}{x}$

20. $\lim_{x \to 0} \dfrac{(x+1)^3 - 1}{x}$

21. $\lim_{x \to 3} \dfrac{x^2 - 9}{x - 3}$

22. $\lim_{x \to 2} \dfrac{x^2 - 7x + 10}{x - 2}$