

$$30) \quad x - \frac{1}{x} = 3, \quad x \neq 0$$

$$\Rightarrow \frac{x^2 - 1}{x} = 3$$

$$\Rightarrow x^2 - 1 = 3x$$

$$\Rightarrow x^2 - 3x - 1 = 0$$

$$a = 1, b = -3, c = -1$$

$$D = b^2 - 4ac$$

$$= (-3)^2 - 4 \times 1 \times (-1)$$

$$= 9 + 4$$

$$= 13$$

$$x = \frac{-b \pm \sqrt{D}}{2a}$$

$$= \frac{3 \pm \sqrt{13}}{2}$$

\therefore roots are $\frac{3 \pm \sqrt{13}}{2}$

$$31) \quad \frac{1}{x+4} - \frac{1}{x-7} = \frac{11}{30}$$

$$\Rightarrow \frac{x-7 - (x+4)}{(x+4)(x-7)} = \frac{11}{30}$$

$$\Rightarrow \frac{x-7-x-4}{x^2-3x-28} = \frac{11}{30}$$

$$\Rightarrow \frac{-11}{x^2-3x-28} = \frac{11}{30}$$

$$\Rightarrow x^2 - 3x - 28 = -30$$

$$\Rightarrow x^2 - 3x + 2 = 0$$

$$\Rightarrow x^2 - 2x - x + 2 = 0$$

$$\Rightarrow x(x-2) - 1(x-2) = 0$$

$$\Rightarrow (x-2)(x-1) = 0$$

$$\Rightarrow x-2=0, x-1=0$$

$$\Rightarrow x=2, x=1$$

4) let Lehman's present age = x years

acc to prob

$$\frac{1}{x-3} + \frac{1}{x+5} = \frac{1}{3}$$

$$\Rightarrow \frac{x+5+x-3}{(x-3)(x+5)} = \frac{1}{3}$$

$$\Rightarrow \frac{2x+2}{x^2+2x-15} = \frac{1}{3}$$

$$\Rightarrow 6x+6 = x^2+2x-15$$

$$\Rightarrow x^2 - 4x - 21 = 0$$

$$\Rightarrow x^2 - 7x + 3x - 21 = 0$$

$$\Rightarrow x(x-7) + 3(x-7) = 0$$

$$\Rightarrow (x-7)(x+3) = 0$$

$$\Rightarrow x-7=0, x+3=0$$

$$\Rightarrow x=7, x=-3$$

rejected
as age is
not negative

\therefore Lehman's present age = 7 years