**Example 3)** Solve: $\left\{x + ycos\left(\frac{y}{x}\right)\right\}$dx = x cos $\left(\frac{y}{x}\right)$

**Solution 3)** $\left\{x + ycos\frac{y}{x}\right\}$ dx = x cos xcos $\left(\frac{y}{x}\right)$dy

OR, $\frac{dx}{x} = \frac{x + ycos\left(\frac{v}{x}\right)}{xcos\left(\frac{v}{x}\right)}$ put y = vx; then $\frac{dx}{dx}$ = v + x $\frac{dv}{dx}$.....(1)

From (1), v + x$\frac{dv}{dx} = \frac{x + vxcos\left(\frac{vx}{x}\right)}{xcos\left(\frac{vx}{x}\right)} = \frac{1 + vcosv}{cosv}$

Or, v + x $\frac{dv}{dx}$ = sec v + v, or, x$\frac{dv}{dx}$ = sec v, or, cos v. dv = $\frac{dx}{x}$

Integrating both sides, we get $\int$ cos v dv = $\int \frac{dx}{x}$ + C

OR, sin v = log |x| + C, or, sin $\frac{y}{x}$ = log|x| + C

Which is the required solution of (1) for the homogeneous equation examples?

**Example 4)** Find the equation to the curve through (1,0) for which the slope at