

**Question 2:**

Using integration, find the area of the region bounded by the line  $y - 1 = x$ , the x-axis and the ordinates  $x = -2$  and  $x = 3$ .

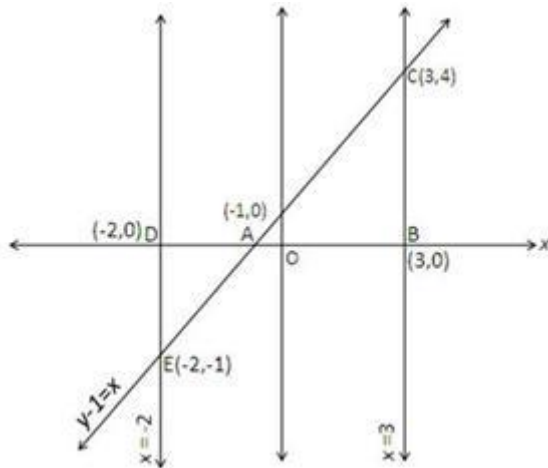
**Solution:**

To find area of region bounded by x-axis the ordinates  $x = -2$  and  $x = 3$  and

$$y - 1 = x \quad \text{--- (1)}$$

Equation (1) is a line that meets at axes at  $(0,1)$  and  $(-1,0)$ .

A rough sketch of the curve is as under:-



Shaded region is required area.

Required area = Region  $ABCA$  + Region  $ADEA$

$$\begin{aligned} A &= \int_{-1}^3 y dx + \left| \int_{-2}^{-1} y dx \right| \\ &= \int_{-1}^3 (x+1) dx + \left| \int_{-2}^{-1} (x+1) dx \right| \\ &= \left[ \frac{x^2}{2} + x \right]_{-1}^3 + \left| \left[ \frac{x^2}{2} + x \right]_{-2}^{-1} \right| \\ &= \left[ \left( \frac{9}{2} + 3 \right) - \left( \frac{1}{2} - 1 \right) \right] + \left| \left[ \left( \frac{1}{2} - 1 \right) - (2 - 2) \right] \right| \\ &= \left[ \frac{15}{2} + \frac{1}{2} \right] + \left| \frac{1}{2} \right| \end{aligned}$$

$$= 8 + \frac{1}{2}$$

$$A = \frac{17}{2} \text{ sq. units}$$