

Question :

Find the equation of the lines which passes through the point (3, 4) and cuts off intercepts from the coordinate axes such that their sum is 14.

Sol. Equation of line in intercept form is $\frac{x}{a} + \frac{y}{b} = 1$

Given that, $a + b = 14 \Rightarrow b = 14 - a$

So, equation of line is: $\frac{x}{a} + \frac{y}{14 - a} = 1$

Since it passes through the point (3, 4), we have

$$\frac{3}{a} + \frac{4}{14 - a} = 1$$

$$\Rightarrow a^2 - 13a + 42 = 0 \Rightarrow (a - 7)(a - 6) = 0$$

$$\therefore a = 7 \text{ or } a = 6$$

When $a = 7$, then $b = 7$

When $a = 6$, then $b = 8$

Thus, equation of line is: $\frac{x}{7} + \frac{y}{7} = 1$, i.e., $x + y = 7$ or $\frac{x}{6} + \frac{y}{8} = 1$