Linear Equations in Two Unknowns

Solution

6. $\begin{cases} 2x-5y=5 \ldots\ldots (1) \\ 2x-3y=15 \ldots\ldots (2) \end{cases}$

$(2)-(1)$:

$2y=10$

$y=5$

Sub $y=5$ into (2),

$2x-3(5)=15$

$x=15$

$\therefore$ The solution is $x=15, y=5$.

7. $\begin{cases} 10-x-2y=5 \ldots\ldots (1) \\ 2x+y+7=5 \ldots\ldots (2) \end{cases}$

From (1),

$10-2y-5=x$

$5-2y=x$

i.e. $x=5-2y \ldots\ldots (3)$

Sub (3) into (2),

$2(5-2y)+y+7=5$

$10-4y+y+7=5$

$y=4$

Sub $y=4$ into (3),

$x=5-2(4)=-3$

$\therefore$ The solution is $x=-3, y=4$.

8. $\begin{cases} 9x-4y+1=0 \ldots\ldots (1) \\ 2y+3x+2=0 \ldots\ldots (2) \end{cases}$

$$\begin{array}{rrrl} (1), & 9x & -4y & =-1 \\ +(2)\ \times 2, & 6x & +4y & =-4 \\ \hline & 15x & & =-5 \\ & x & & =-\frac{1}{3} \end{array}$$

Sub $x=-\frac{1}{3}$ into (2),

$3\left(-\frac{1}{3}\right)+2y=-2$

$y=-\frac{1}{2}$

$\therefore$ The solution is $x=-\frac{1}{3}, y=-\frac{1}{2}$

9. $\begin{cases} 8s-3t=7 \ldots\ldots (1) \\ 8s+5t=-1 \ldots\ldots (2) \end{cases}$

$$\begin{array}{rrrl} (2), & 8s & +5t & =-1 \\ -(1), & 8s & -3t & =7 \\ \hline (2)-(1) & & 8t & =-8 \\ & & t & =-1 \end{array}$$

Sub $t=-1$ into (1),

$8s-3(-1)=7$

$8s+3=7$

$s=\frac{1}{2}$

$\therefore$ The solution is $s=\frac{1}{2}, t=-1$.

10. $\begin{cases} \frac{x}{6}-\frac{y}{3}=4 \ldots\ldots (1) \\ \frac{x}{2}+y=4 \ldots\ldots (2) \end{cases}$

$(1)\times 3$: $\frac{x}{2}-y=12 \ldots\ldots (3)$

$(3)-(2)$:

$-2y=8$

$y=-4$

Sub $y=-4$ into (2),

$\frac{x}{2}+(-4)=4$

$x=16$

$\therefore$ The solution is $x=16, y=-4$.