SIMULTANEOUS EQUATIONS

Solve the simultaneous equations

1 $x+7y=5$
$x-7y=-9$

2 $x+5y=34$
$x-5y=-6$

3 $4x-5y=30$
$4x-2y=24$

4 $3x-y=5$
$5x+3y=-8$

5 $2m+3n=-4$
$3m+2n=-6$

6 $-2x+7y=4$
$-3x+5y=-5$

7 $x+5y=-13$
$2x-y=7$

8 $5x+2y=9$
$9x-7y=-5$

① $2x=-4$ $\therefore x=-2$ and $-2+7y=5$ so $y=1$

2) $2x=28$ $\therefore x=14$ and $14+5y=34$ so $y=4$

3) $-5y+2y=30-24 \iff -3y=6$ $y=-2$

and substituting, we obtain: $4x+10=30$ $x=5$

4) $14x=15-8$ $14x=7$ $x=1/2$

$y=\frac{3}{2}-5=-3.5=-7/2$

5) $3\times① - 2\times② \Rightarrow 9n-4n=-12+12$ so $n=0$ $m=-2$

6) $3\times① - 2\times② \Rightarrow 21y-10y=12+10$ so $11y=22$ $y=2$

and $-2x+7\times2=4 \Rightarrow -2x=-10$ $x=5$

7) $① + 5\times② \Rightarrow x+10x=-13+35$ so $11x=22$ $x=2$

and $2+5y=-13 \Rightarrow 5y=-15$ $y=-3$

8) $9\times① - 5\times② \Rightarrow 18y+35y=81+25$ so $53y=106$

$y=2$

$5x+2\times2=9$ so $5x=5$

$x=1$

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19 $3(x-y)-8(x+y)=7$
$2(x+y)+5(x-y)=-65$

20 $2(3a-b)=3(a+b)$
$3(a-4b)+46=5a$

21 $5(2x-y)=7x+1$
$3(3x+y)=5(x-y+12)$

19) $\Leftrightarrow \begin{cases} -5x-11y=7 & ① \\ 7x-3y=-65 & ② \end{cases}$

$7\times① + 5\times② \Rightarrow -77y-15y=49-325$ so $-92y=-276$ $\boxed{y=3}$

$-5x-11\times 3=7$ so $-5x=40$ $\boxed{x=-8}$

20) $\Leftrightarrow \begin{cases} 6a-2b-3a-3b=0 \\ 3a-12b+46-5a=0 \end{cases} \Leftrightarrow \begin{cases} 3a-5b=0 & ① \\ -2a-12b=-46 \end{cases}$
$\Leftrightarrow a+6b=23$ ②

① $\Rightarrow a=\frac{5}{3}b$

so $\frac{5}{3}b+6b=23 \Rightarrow \frac{23}{3}b=23$ so $\boxed{b=3}$

and $\boxed{a=5}$

21) $\begin{cases} 10x-5y-7x=1 \\ 9x+3y-5x+5y=60 \end{cases} \Leftrightarrow \begin{cases} 3x=5y+1 \\ 4x+8y=60 \end{cases} \Leftrightarrow \begin{cases} 3x-5y=1 \\ x+2y=15 \end{cases}$

so $\begin{cases} 3x-5y=1 \\ 3x+6y=45 \end{cases}$ $\begin{cases} 3x-5y=1 \\ 11y=44 \end{cases}$ $\begin{cases} y=4 \\ 3x=1+5y=1+20 \end{cases}$

so $\begin{cases} x=7 \\ y=4 \end{cases}$