18. $\begin{cases} 2x-3y=-8 \\ 14x-21y=3 \end{cases}$ Adding 7 times the first equation to -1 times the second equation gives

$$\begin{array}{r} 14x-21y=-56 \\ -14x+21y=-3 \\ \hline 0=-59 \end{array}$$

, which is false. Therefore, there is no solution to this system.

20. $\begin{cases} 25x-75y=100 \\ -10x+30y=-40 \end{cases}$ Adding $\frac{1}{23}$ times the first equation to $\frac{1}{10}$ times the second equation gives

$$\begin{array}{r} x-3y=4 \\ -x+3y=-4 \\ \hline 0=0 \end{array}$$

, which is always true.

We now put the equation in slope-intercept form. We have $x-3y=4 \quad \Leftrightarrow \quad -3y=-x+4$ $\Leftrightarrow \quad y=\frac{1}{3}x-\frac{4}{3}$, so a solution is any pair of the form $\left(x, \frac{1}{3}x-\frac{4}{3}\right)$, where x is any real number.

22. $\begin{cases} u-30v=-5 \\ -3u+80v=5 \end{cases}$ Adding 3 times the first equation to the second equation gives

$$\begin{array}{r} 3u-90v=-15 \\ -3u+80v=5 \\ \hline -10v=-10 \end{array} \quad \Leftrightarrow \quad v=1.$$

So $u-30(1)=-5 \quad \Leftrightarrow \quad u=25$. Thus, the solution is $(u,v)=(25,1)$.

24. $\begin{cases} \frac{3}{2}x-\frac{1}{3}y=\frac{1}{2} \\ 2x-\frac{1}{2}y=-\frac{1}{2} \end{cases}$ Adding -6 times the first equation to 4 times the second equation gives

$$\begin{array}{r} -9x+2y=-3 \\ 8x-2y=-2 \\ \hline -x\qquad=-5 \end{array} \quad \Leftrightarrow \quad x=5. \text{ So } 9(5)-2y=3 \quad \Leftrightarrow \quad y=21. \text{ Thus the solution is } (5,21).$$

26. $\begin{cases} x-3y=4x-6y-10 \\ 2x=12y+10 \end{cases}$ Simplifying the first equation rearranging the second equation gives the system $\begin{cases} -3x+3y=-10 \\ 2x-12y=10 \end{cases}$. Adding 2 times the first equation to 3 times the second equation gives

$$\begin{array}{r} -6x+6y=-20 \\ 6x-36y=30 \\ \hline -30y=10 \end{array} \quad \Leftrightarrow \quad y=-\frac{1}{3}.$$

So $2x-12\left(-\frac{1}{3}\right)=10 \quad \Leftrightarrow \quad 2x+4=10 \quad \Leftrightarrow \quad x=3$. Thus the solution is $\left(3,-\frac{1}{3}\right)$.

28. $\begin{cases} x=2x+y \\ x=2y+1 \end{cases}$ Rearranging the second equation gives the system $\begin{cases} x+y=0 \\ x-2y=1 \end{cases}$. Adding the first equation to -1 times the second equation gives

$$\begin{array}{r} x+y=0 \\ -x+2y=-1 \\ \hline 3y=-1 \end{array} \quad \Leftrightarrow \quad y=-\frac{1}{3}.$$

So $x+\left(-\frac{1}{3}\right)=0 \quad \Leftrightarrow \quad x=\frac{1}{3}$. Thus, the solution is $\left(\frac{1}{3},-\frac{1}{3}\right)$.