Solving Systems of Linear Equations by the Elimination Method

Total points = 57

1. $2x-3y=12$
$2x-3y-12=0$ ✓
$4x+3y=24$
$4x+3y-24=0$ ✓

$$\begin{array}{rrcl} & 2x-3y-12 & = & 0 \\ + & 4x+3y-24 & = & 0 \\ \hline & 6x-36 & = & 0\checkmark \end{array}$$

$6x-36=0$
$\frac{6x}{6}=\frac{36}{6}$ ✓
$\boxed{x=6}$ ✓
$2x-3y=12$ ✓
$2(6)-3y=12$ ✓
$12-3y=12$ ✓
$-3y=12-12$ ✓
$-3y=0$ ✓
$\boxed{y=0}$ ✓
∴ Solution = $\boxed{(6,0)}$ ✓

2. $5x+11=7y$
$3[5x-7y+11=0]$ ✓
$\boxed{15x-21y+33=0}$ ✓
$8y-18=3x$
$5[-3x+8y-18=0]$ ✓
$\boxed{-15x+40y-90=0}$ ✓

$$\begin{array}{rrcl} & 15x-21y+33 & = & 0 \\ + & -15x+40y-90 & = & 0 \\ \hline & 19y-57 & = & 0\checkmark \end{array}$$

$19y-57=0$
$\frac{19y}{19}=\frac{57}{19}$ ✓
$\boxed{y=3}$ ✓
$5x+11=7y$ ✓
$5x+11=7(3)$ ✓
$5x+11=21$ ✓
$5x=21-11$ ✓
$\frac{5x}{5}=\frac{10}{5}$ ✓
$\boxed{x=2}$ ✓
∴ Solution = $\boxed{(2,3)}$ ✓

3. $3x+4y=7$
$\boxed{3x+4y-7=0}$ ✓
$2x-2y=7$
$2[2x-2y-7=0]$ ✓
$\boxed{4x-4y-14=0}$ ✓

$$\begin{array}{rrcl} & 3x+4y-7 & = & 0 \\ + & 4x-4y-14 & = & 0 \\ \hline & 7x-21 & = & 0\checkmark \end{array}$$

$7x-21=0$
$\frac{7x}{7}=\frac{21}{7}$ ✓
$\boxed{x=3}$ ✓
$2x-2y=7$ ✓
$2(3)-2y=7$ ✓
$6-2y=7$ ✓
$-2y=7-6$ ✓
$\frac{-2y}{-2}=\frac{1}{-2}$ ✓
$\boxed{y=-\frac{1}{2}}$ ✓
∴ Solution = $\boxed{\left(3,-\frac{1}{2}\right)}$ ✓

4. $x=y+1$
$\boxed{x-y-1=0}$ ✓
$x-y=1$
$-1[x-y-1=0]$ ✓
$\boxed{-x+y+1=0}$ ✓

$$\begin{array}{rrcl} & x-y-1 & = & 0 \\ + & -x+y+1 & = & 0 \\ \hline & 0 & = & 0\checkmark \end{array}$$

∴ Solution = $\boxed{\text{None}}$ ✓

5. $2x+y=4$
$\boxed{2x+y-4=0}$ ✓
$x+2y=4$
$-2[x+2y-4=0]$ ✓
$\boxed{-2x-4y+8=0}$ ✓

$$\begin{array}{rrcl} & 2x+y-4 & = & 0 \\ + & -2x-4y+8 & = & 0 \\ \hline & -3y+4 & = & 0\checkmark \end{array}$$

$-3y+4=0$
$\frac{-3y}{-3}=\frac{-4}{-3}$ ✓
$\boxed{y=\frac{4}{3}}$ ✓
$2x+y=4$ ✓
$2x+\frac{4}{3}=4$ ✓
$2x=4-\frac{4}{3}$ ✓
$\frac{1}{2}\left[2x=\frac{8}{3}\right]$ ✓
$\boxed{x=\frac{4}{3}}$ ✓
∴ Solution = $\boxed{\left(\frac{4}{3},\frac{4}{3}\right)}$ ✓

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$12-3y=12$ ✓
$-3y=12-12$ ✓
$-3y=0$ ✓
$\boxed{y=0}$ ✓
∴ Solution = $\boxed{(6,0)}$ ✓

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$19y-57=0$
$\frac{19y}{19}=\frac{57}{19}$ ✓
$\boxed{y=3}$ ✓
$5x+11=7y$ ✓
$5x+11=7(3)$ ✓
$5x+11=21$ ✓
$5x=21-11$ ✓
$\frac{5x}{5}=\frac{10}{5}$ ✓
$\boxed{x=2}$ ✓
∴ Solution = $\boxed{(2,3)}$ ✓

3. $3x+4y=7$
$\boxed{3x+4y-7=0}$ ✓
$2x-2y=7$
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4. $x=y+1$
$\boxed{x-y-1=0}$ ✓
$x-y=1$
$-1[x-y-1=0]$ ✓
$\boxed{-x+y+1=0}$ ✓

$$\begin{array}{rrcl} & x-y-1 & = & 0 \\ + & -x+y+1 & = & 0 \\ \hline & 0 & = & 0\checkmark \end{array}$$

∴ Solution = $\boxed{\text{None}}$ ✓

5. $2x+y=4$
$\boxed{2x+y-4=0}$ ✓
$x+2y=4$
$-2[x+2y-4=0]$ ✓
$\boxed{-2x-4y+8=0}$ ✓

$$\begin{array}{rrcl} & 2x+y-4 & = & 0 \\ + & -2x-4y+8 & = & 0 \\ \hline & -3y+4 & = & 0\checkmark \end{array}$$

$-3y+4=0$
$\frac{-3y}{-3}=\frac{-4}{-3}$ ✓
$\boxed{y=\frac{4}{3}}$ ✓
$2x+y=4$ ✓
$2x+\frac{4}{3}=4$ ✓
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$\frac{1}{2}\left[2x=\frac{8}{3}\right]$ ✓
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∴ Solution = $\boxed{\left(\frac{4}{3},\frac{4}{3}\right)}$ ✓