MAC1105
7.1 Practice Problems

Solve the following systems by substitution.

1. $\begin{cases} 5x+6y=1 \\ y=3x+4 \end{cases}$

$5x+6(3x+4)=1$
$5x+18x+24=1$
$23x+24=1$
$-24 \quad -24$
$\frac{23x}{23}=\frac{-23}{23}$
$x=-1$

$y=3(-1)+4$
$=-3+4$
$=1$

$(-1,1)$ Solution

2. $\begin{cases} 7x-2y=10 \\ x+3y=8 \end{cases}$
$-3y \quad -3y$

① Solve for one variable: $x=8-3y$

② Substitute into other equation: $7(8-3y)-2y=10$
$56-21y-2y=10$
$56-23y=10$
$-56 \quad -56$
$\frac{-23y}{-23}=\frac{-46}{-23}$
$y=2$

③ Solve

④ Back Substitute: $x=8-3(2)$
$=8-6$
$=2$

Solution $(2,2)$

Solve the following systems by elimination.

3. $\begin{cases} 2x+y=7 \\ 3x-y=-2 \end{cases}$

① Add: $5x=5$
② Solve: $\frac{5x}{5}=\frac{5}{5}$
$x=1$

③ Back sub: $2(1)+y=7$
$2+y=7$
$-2 \quad -2$
$y=5$

$(1,5)$ Solution

4. $\begin{cases} 2x+3y=-9 \\ 4x-y=17 \end{cases}$ $\times 3$ → Mult the equation by 3 so that when you add a variable cancels

① Rewrite: $2x+3y=-9$
$12x-3y=51$

② Add: $\frac{14x}{14}=\frac{42}{14}$

③ Solve: $x=3$

④ Back sub: $2(3)+3y=-9$
$6+3y=-9$
$-6 \quad -6$
$\frac{3y}{3}=\frac{-15}{3}$
$y=-5$

Solution $(3,-5)$

Solve the following systems by substitution or elimination.

5. $\begin{cases} 2x+3y=8 \leftarrow \text{multiply by } -3 \\ 3x+4y=-5 \leftarrow \text{multiply by } 2 \end{cases}$

① Rewrite
$-6x-9y=-24$
$6x+8y=-10$

② Add
$-y=-34$
$\frac{-y}{-1}=\frac{-34}{-1}$

③ Solve
$y=34$

④ Back sub
$2x+3(34)=8$
$2x+102=8$
$-102 \quad -102$
$\frac{2x}{2}=\frac{-94}{2}$
$x=-47$

Solution
$(-47, 34)$

6. $\begin{cases} 6x-y=-15 \\ 4x+5y=7 \end{cases}$

① Solve for one variable
$6x-y=-15$
$-y=-6x-15$
$y=6x+15$

② sub $4x+5(6x+15)=7$

③ Solve $4x+30x+75=7$
$34x+75=7$
$-75 \quad -75$
$\frac{34x}{34}=\frac{-68}{34}$
$x=-2$

④ Back sub
$y=6(-2)+15$
$y=-12+15$
$y=3$

Solution
$(-2, 3)$

7. $\begin{cases} 3x-2y=8 \leftarrow \text{Mult by } 2 \\ -6x+4y=-16 \end{cases}$

① Rewrite
$6x-4y=16$
$-6x+4y=-16$

② Add
$0+0=0$
$0=0$
TRUE

Solution
$\{(x,y) \mid 3x-2y=8\}$
or
$\{(x,y) \mid -6x+4y=-16\}$
or

Solve for y to get
$3x-2y=8$
$-3x \quad -3x$
$\frac{-2y}{-2}=\frac{-3x+8}{-2}$
$y=\frac{3}{2}x-4$

$\left(x, \frac{3}{2}x-4\right)$

8. $\begin{cases} 4x-y=5 \\ 2y-8x=7 \end{cases}$

$4x-y=5$
$-4x \quad -4x$
$-y=-4x+5$
$y=4x-5$

$2(4x-5)-8x=7$
$8x-10-8x=7$
$-10=7$
FALSE

No Solution