Name : _____ Key _____
Date : _____ Period : ___

Solve each system by the method of substitution.

1. $\begin{cases} x - y = 2 \\ 6x - 5y = 16 \end{cases}$ $\Rightarrow$ $x = 2 + y$
$6x - 5y = 16$

$6(2+y) - 5y = 16$
$12 + 6y - 5y = 16$
$y = 4$

$x = 2 + 4$
$x = 6$

$\boxed{(6, 4)}$

2. $\begin{cases} 2x - y + 2 = 0 \\ 4x + y - 5 = 0 \end{cases}$ $\Rightarrow$ $2x - y = -2$
$4x + y = 5$ $\Rightarrow$ $2x - y = -2$
$y = 5 - 4x$

$2x - (5 - 4x) = -2$
$2x - 5 + 4x = -2$
$6x = 3$
$x = \frac{1}{2}$

$y = 5 - 4(\frac{1}{2})$
$y = 5 - 2$
$y = 3$

$\boxed{(\frac{1}{2}, 3)}$

3. $\begin{cases} 6x - 3y - 4 = 0 \\ x + 2y - 4 = 0 \end{cases}$ $\Rightarrow$ $6x - 3y = 4$
$x = 4 - 2y$

$6(4-2y) - 3y = 4$
$24 - 12y - 3y = 4$
$-15y = -20$
$y = \frac{4}{3}$

$x = 4 - 2(\frac{4}{3})$
$= 4 - \frac{8}{3}$
$x = \frac{4}{3}$

$\boxed{(\frac{4}{3}, \frac{4}{3})}$

4. $\begin{cases} x + 4y = 3 \\ 2x - 7y = -24 \end{cases}$ $\Rightarrow$ $x = 3 - 4y$
$2x - 7y = -24$

$2(3-4y) - 7y = -24$
$6 - 8y - 7y = -24$
$-15y = -30$
$y = 2$

$x = 3 - 4(2)$
$= 3 - 8$
$x = -5$

$\boxed{(-5, 2)}$

5. $\begin{cases} 0.5x + 3.2y = 9 \\ 0.2x - 1.6y = -3.6 \end{cases}$ $\Rightarrow$ $0.5x + 3.2y = 9$
$0.2x = 1.6y - 3.6$
$x = 8y - 18$

$0.5(8y-18) + 3.2y = 9$
$4y - 9 + 3.2y = 9$
$7.2y - 9 = 9$
$7.2y = 18$
$y = 2.5$

$x = 8(2.5) - 18$
$x = 2$

$\boxed{(2, 2.5)}$

6. $\begin{cases} x^2 - y = 0 \\ 2x + y = 0 \end{cases}$ $\Rightarrow$ $x^2 - y = 0$
$y = -2x$

$x^2 - (-2x) = 0$
$x^2 + 2x = 0$
$x(x+2) = 0$
$x = -2$

$y = -2(-2)$
$y = 4$

$\boxed{(-2, 4)}$

7. $\begin{cases} x - 2y = 0 \\ 3x - y^2 = 0 \end{cases}$ $\Rightarrow$ $x = 2y$
$3x - y^2 = 0$

$3(2y) - y^2 = 0$
$6y - y^2 = 0$
$y(6-y) = 0$
$y = 6$

$x = 2(6)$
$x = 12$

$\boxed{(6, 12)}$

8. $\begin{cases} x - y = -1 \\ x^2 - y = -4 \end{cases}$ $\Rightarrow$ $x = y - 1$
$x^2 - y = -4$

$(y-1)^2 - y = -4$
$(y-1)(y-1) - y = -4$
$y^2 - 2y + 1 - y = -4$
$y^2 - 3y + 5 = 0$

$-y = -4 - x^2$
$y = 4 + x^2$

$x - (4 + x^2) = -1$
$x - 4 - x^2 = -1$
$-x^2 + x - 4 = -1$
$-x^2 + x - 3 = 0$
$x^2 - x + 3 = 0$

$\boxed{\text{no real solutions}}$

Solve each system by the method of elimination.

9. $-2\begin{cases}x-y=11 \\ 2x+y=19\end{cases}$ ⇒ $\begin{aligned}-2x+2y=-22 \\ 2x+y=19\end{aligned}$

$$3y=-3$$
$$y=-1$$

$2x-1=19$

$2x=20$

$X=10$

$\boxed{(10,-1)}$

10. $\begin{cases}-2x-9y=-25 \\ -1(-4x-9y=-23)\end{cases}$ ⇒ $\begin{aligned}-2x-9y=-25 \\ 4x+9y=23\end{aligned}$

$$2x=-2$$
$$x=-1$$

$-2(-1)-9y=-25$

$2-9y=-25$

$-9y=-27$

$y=3$

$\boxed{(-1,3)}$

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11. $\begin{cases}8x+y=-16 \\ (-3x+y=-5)-1\end{cases}$ ⇒ $\begin{aligned}8x+y=-16 \\ 3x-y=5\end{aligned}$

$$11x=-11$$
$$\boxed{x=-1}$$

$8(-1)+y=-16$

$-8+y=-16$

$\boxed{y=-8}$

$\boxed{(-1,-8)}$

12. $7\begin{cases}5x+y=9 \\ 10x-7y=-18\end{cases}$ ⇒ $\begin{aligned}35x+7y=63 \\ 10x-7y=-18\end{aligned}$

$$45x=45$$
$$x=1$$

$5+y=9$

$y=4$

$\boxed{(1,4)}$

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13. $\begin{cases}(-3x+7y=-16)-3 \\ -9x+5y=16\end{cases}$ ⇒ $\begin{aligned}9x-21y=48 \\ -9x+5y=16\end{aligned}$

$$-16y=64$$
$$y=-4$$

$-9x+5(-4)=16$

$-9x-20=16$

$-9x=36$

$X=-4$

$\boxed{(-4,-4)}$

14. $\begin{cases}-3(5x+4y=-30) \\ 5(3x-9y=-18)\end{cases}$ ⇒ $\begin{aligned}-15x-12y=90 \\ 15x-45y=-90\end{aligned}$

$$-57y=0$$
$$y=0$$

$5x+0=-30$

$X=-6$

$\boxed{(-6,0)}$

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15. $\begin{cases}6(5x+4y=-14) \\ -4(3x+6y=6)\end{cases}$ ⇒ $\begin{aligned}30x+24y=-84 \\ -12x-24y=-24\end{aligned}$

$$18x=-108$$
$$X=-6$$

$-30+4y=-14$

$4y=16$

$y=4$

$\boxed{(-6,4)}$

16. $\begin{cases}5(2x+8y=6) \\ 2(-5x-20y=-15)\end{cases}$ ⇒ $\begin{aligned}10x+40y=30 \\ -10x-40y=-30\end{aligned}$

$$0=0$$

$\boxed{\mathbb{R}}$