Principles of Algebra Name/Date Clee / Today

ALL PROBLEMS CAN BE COMPLETED ON THIS WORKSHEET

WS 9B.2 – More Solving Systems of Equations by Substitution

#1-7, Solve each system of equations by the substitution method.

1. $\begin{cases} x = y - 4 \\ 2x - y = 6 \end{cases}$

$2x - y = 6$
$2(y-4) - y = 6$
$2y - 8 - y = 6$
$y - 8 = 6$
$y = 14$

$x = y - 4$
$x = 14 - 4$
$x = 10$

The solution is (10, 14).

2. $\begin{cases} 2x + 2y = -6 \\ 5x + 5y = 10 \end{cases}$ → $2x + 2y = -6$
$2x = -2y - 6$
$x = -y - 3$

$5x + 5y = 10$
$5(-y-3) + 5y = 10$
$-5y - 15 + 5y = 10$
$-15 \neq 10$

This system has no solution.
(These lines are parallel.)

3. $\begin{cases} 2x + 7y = -3 \\ 3x + y = -14 \end{cases}$ → $3x + y = -14$
$y = -3x - 14$

$2x + 7y = -3$
$2x + 7(-3x - 14) = -3$
$2x - 21x - 98 = -3$
$-19x - 98 = -3$
$-19x = 95$
$x = -5$

$y = -3x - 14$
$y = -3(-5) - 14$
$y = 15 - 14$
$y = 1$

The solution is (-5, 1).

4. $\begin{cases} 20y - 5x = 15 \\ 2x - 3y = 4 \end{cases}$ → $20y - 5x = 15$
$-5x = 15 - 20y$
$x = -3 + 4y$

$2x - 3y = 4$
$2(-3 + 4y) - 3y = 4$
$-6 + 8y - 3y = 4$
$5y - 6 = 4$
$5y = 10$
$y = 2$

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

The solution is (5, 2).

5. $\begin{cases} -9x - 3y = -12 \\ -6x - 2y = -8 \end{cases}$ → $-9x - 3y = -12$

$-3y = 9x - 12$

$y = -3x + 4$

$-6x - 2y = -8$

$-6x - 2(-3x + 4) = -8$

$-6x + 6x - 8 = -8$

$-8 = -8$

Infinitely many solutions. All points on the line $y = -3x + 4$ are solutions to the system.

(These two lines are the same line.)

6. $\begin{cases} 30x = -10y \\ 3x - 2y = -15 \end{cases}$ → $30x = -10y$

$-3x = y$

$y = -3x$

$3x - 2y = -15$

$3x - 2(-3x) = -15$

$3x + 6x = -15$

$9x = -15$

$x = \frac{-15}{9}$

$x = \frac{-5}{3}$

$y = -3x$

$y = -3\left(-\frac{5}{3}\right)$

$y = 5$

The solution is $\left(-\frac{5}{3}, 5\right)$.

7. $\begin{cases} y = -3x - 17 \\ y = 5x - 25 \end{cases}$

$y = 5x - 25$

$-3x - 17 = 5x - 25$

$-8x - 17 = -25$

$-8x = -8$

$x = 1$

$y = 5x - 25$

$y = 5(1) - 25$

$y = 5 - 25$

$y = -20$

The solution is $(1, -20)$.

8. Two cans of paint and one brush cost $29. Three cans of the same paint and two brushes cost $46. Find the cost of one can of paint and the cost of one brush.

let p = price of a paint can

let b = price of a brush

$\begin{cases} 2p + b = 29 \\ 3p + 2b = 46 \end{cases}$ → $2p + b = 29$

$b = 29 - 2p$

$3p + 2b = 46$

$3p + 2(29 - 2p) = 46$

$3p + 58 - 4p = 46$

$-p + 58 = 46$

$-p = -12$

$p = 12$

$b = 29 - 2p$

$b = 29 - 2(12)$

$b = 29 - 24$

$b = 5$

A can of paint costs $12. A brush costs $5.