NAME _____ DATE ADV. PERIOD 2/9/16

Substitution

Use substitution to solve each system of equations. When necessary, solve one equation in the system for a variable first. Be sure to show all work and box/circle your final answer.

1. $y = 4x$
$x + y = 5$

$x + 4x = 5$
$\frac{5x}{5} = \frac{5}{5}$
$x = 1$
$y = 4(1) = 4$
$(1, 4)$

2. $y = 2x$
$x + 3y = -14$

$x + 3(2x) = -14$
$x + 6x = -14$
$7x = -14$
$x = -2$
$y = 2(-2) = -4$
$(-2, -4)$

3. $y = 3x$
$2x + y = 15$

$2x + (3x) = 15$
$5x = 15$
$x = 3$
$y = 3(3) = 9$
$(3, 9)$

4. $x = -4y$
$3x + 2y = 20$

$3(-4y) + 2y = 20$
$-12y + 2y = 20$
$-10y = 20$
$y = -2$
$x = -4(-2) = 8$
$(8, -2)$

5. $y = x - 1$
$x + y = 3$

$x + (x - 1) = 3$
$x + x - 1 = 3$
$2x - 1 = 3$
$2x = 4$
$x = 2$
$2 + y = 3$
$y = 1$
$(2, 1)$

6. $x = y - 7$
$x + 8y = 2$

$(y - 7) + 8y = 2$
$y - 7 + 8y = 2$
$9y - 7 = 2$
$9y = 9$
$y = 1$
$x = 1 - 7$
$x = -6$
$(-6, 1)$

7. $y = 4x - 1$
$y = 2x - 5$

$4x - 1 = 2x - 5$
$2x - 1 = -5$
$2x = -4$
$x = -2$
$y = 4(-2) - 1 = -9$
$(-2, -9)$

8. $y = 3x + 8$
$5x + 2y = 5$

$5x + 2(3x + 8) = 5$
$5x + 6x + 16 = 5$
$11x + 16 = 5$
$11x = -11$
$x = -1$
$y = 3(-1) + 8 = 5$
$(-1, 5)$

9. $2x - 3y = 21$
$y = 3 - x$

$2x - 3(3 - x) = 21$
$2x - 9 + 3x = 21$
$5x - 9 = 21$
$5x = 30$
$x = 6$
$y = 3 - 6$
$= -3$
$(6, -3)$

10. $y = 5x - 8$
$4x + 3y = 33$

$4x + 3(5x - 8) = 33$
$4x + 15x - 24 = 33$
$19x - 24 = 33$
$19x = 57$
$x = 3$
$y = 5(3) - 8 = 7$
$(3, 7)$

11. $x + 2y = 13 \rightarrow x = -2y + 13$
$3x - 5y = 6$

$3(-2y + 13) - 5y = 6$
$-6y + 39 - 5y = 6$
$-11y + 39 = 6$
$-11y = -33$
$y = 3$
$x = -2(3) + 13 = 7$
$(3, 7)$

12. $x + 5y = 4 \rightarrow x = -5y + 4$
$3x + 15y = -1$

$3(-5y + 4) + 15y = -1$
$-15y + 12 + 15y = -1$
$12 = -1$
NO SOLUTION

13. $3x - y = 4 \rightarrow -y = -3x + 4$
$y = 3x - 4$
$2x - 3y = -9$

$2x - 3(3x - 4) = -9$
$2x - 9x + 12 = -9$
$-7x + 12 = -9$
$-7x = -21$
$x = 3$
$y = 3(3) - 4 = 5$
$(3, 5)$

14. $x + 4y = 8 \rightarrow x = -4y + 8$
$2x - 5y = 29$

$2(-4y + 8) - 5y = 29$
$-8y + 16 - 5y = 29$
$-13y + 16 = 29$
$-13y = 13$
$y = -1$
$x = -4(-1) + 8 = 12$
$(12, 13)$

15. $x - 5y = 10 \rightarrow x = 5y + 10$
$2x - 10y = 20$

$2(5y + 10) - 10y = 20$
$10y + 20 - 10y = 20$
$20 = 20$
infinite