Solving Systems of Equations by Substitution

Name:_____ Date:_____

Solve each system by Substitution. Write the solution in the blank.

(-1, -2) 1. $y = 2x$
$2x + 3y = -8$

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

$2x + 6x = -8$

$8x = -8$

$x = -1$

$y = -2$

(2, 9) 2. $y = x + 7$
$2x + 3y = 31$

$2x + 3(x + 7) = 31$

$2x + 3x + 21 = 31$

$5x = 10$

$x = 2 \quad y = 9$

(-28, -7) 3. $x = 4y$
$3x - 10y = -14$

$3(4y) - 10y = -14$

$12y - 10y = -14$

$2y = -14$

$y = -7$

$x = -28$

(-1, 5) 4. $x = -y + 4$
$4x + y = 1$

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

$-4y + 16 + y = 1$

$-3y = -15$

$y = 5 \quad x = -1$

(5, 15) 5. $x = 2y - 25$
$3x - y = 0$

$3(2y - 25) - y = 0$

$6y - 75 - y = 0$

$5y = 75$

$y = 15$

$x = 5$

(-1, 3) 6. $7x + 4y = 5$
$x = 6y - 19$

$7(6y - 19) + 4y = 5$

$42y - 133 + 4y = 5$

$46y - 133 = 5$

$46y = 138$

$y = 3$

$x = -1$

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Kuta Software - Infinite Algebra 1 Name_____

Solving Systems of Equations by Substitution

Date_____ Period____

Solve each system by substitution.

1) $y = 6x - 11$
$-2x - 3y = -7$

(2, 1)

$-2x - 3(6x - 11) = -7$ $-20x = -40$

$-2x - 18x + 33 = -7$ $x = 2$

$-20x + 33 = -7$ $y = 1$

2) $2x - 3y = -1$
$y = x - 1$

(4, 3)

$2x - 3(x - 1) = -1$

$2x - 3x + 3 = -1$

$-x = -4$ $x = 4$ $y = 3$

3) $y = -3x + 5$
$5x - 4y = -3$

(1, 2)

$5x - 4(-3x + 5) = -3$

$5x + 12x - 20 = -3$

$17x = 17$ $x = 1$ $y = 2$

4) $-3x - 3y = 3$
$y = -5x - 17$

(-4, 3)

$-3x - 3(-5x - 17) = 3$ $12x = -48$

$-3x + 15x + 51 = 3$ $x = -4$

$12x + 51 = 3$

5) $y = -2$
$4x - 3y = 18$

(3, -2)

$4x - 3(-2) = 18$

$4x + 6 = 18$

$4x = 12$ $x = 3$

6) $y = 5x - 7$
$-3x - 2y = -12$

(2, 3)

$y = 3$

$-3x - 2(5x - 7) = -12$ $-13x = -26$

$-3x - 10x + 14 = -12$ $x = 2$

$-13x + 14 = -12$ $y = 3$

7) $-4x + y = 6$
$-5x - y = 21$

(-3, -6)

$y = 6 + 4x$

$-5x - (6 + 4x) = 21$

$-5x - 6 - 4x = 21$

$-9x = 27$ $x = -3$ $y = -6$

8) $-7x - 2y = -13$
$x - 2y = 11$

(3, -4)

$x = 11 + 2y$

$-7(11 + 2y) - 2y = -13$

$-77 - 14y - 2y = -13$

$-16y = 64$ $y = -4$ $x = 3$

9) $-5x + y = -2$
$-3x + 6y = -12$

(0, -2)

$y = -2 + 5x$

$-3x + 6(-2 + 5x) = -12$

$-3x - 12 + 30x = -12$

$-27x = 0$ $x = 0$

$y = -2$

10) $-5x + y = -3$
$3x - 8y = 24$

(0, -3)

$y = -3 + 5x$

$3x - 8(-3 + 5x) = 24$

$3x + 24 - 40x = 24$ 36

$-37x = 0$ $x = 0$ $y = -3$

11) $x+3y=1$
$-3x-3y=-15$

(7, −2)

$x=1-3y$

$-3(1-3y)-3y=-15$

$-3+9y-3y=-15$ $x=7$

$-3+6y=-15$ $6y=-12$ $y=-2$

12) $-3x-8y=20$
$-5x+y=19$

(−4, 39)

$y=19+5x$

$-3x-8(19+5x)=20$

$-3x-152-40x=26$

$-43x=172$ $x=-4$ $y=39$

13) $-3x+3y=4$
$-x+y=3$

$y=3-x$

$-3x+3(3+x)=4$

$-3x+9+3x=4$ parallel lines.

$9=4$ ← no solution

14) $-3x+3y=3$
$-5x+y=13$

(−3, −2)

$y=13+5x$

$-3x+3(13+5x)=3$

$-3x+39+15x=3$

$12x=-36$ $x=-3$ $y=-2$

15) $6x+6y=-6$
$5x+y=-13$

(−3, 2)

$y=-13-5x$

$6x+6(-13-5x)=-6$

$6x-78-30x=-6$

$-24x=72$ $x=-3$ $y=2$

16) $2x+y=20$
$6x-5y=12$

$y=20-2x$

$6x-5(20-2x)=12$

(7, 6)

$6x-100+10x=12$

$16x=112$

$x=7$ $y=6$

17) $-3x-4y=2$
$3x+3y=-3$

(−2, 1)

$3y=-3-3x$

$y=-1-x$

$-3x-4(-1-x)=2$

$-3x+4+4x=2$

$x=-2$ $y=1$

18) $-2x+6y=6$
$-7x+8y=-5$

(3, 2)

$-2x=6-6y$

$x=-3+3y$ $x=3$

$-7(-3+3y)+8y=-5$

$21-21y+8y=-5$ $-13y=-26$

$y=2$

19) $-5x-8y=17$
$2x-7y=-17$

(5, 1)

$2x=-17+7y$

$x=\frac{-17}{2}+\frac{7}{2}y$

$-5\left(\frac{-17}{2}+\frac{7}{2}y\right)-8y=17$

$-5(-17+7y)-16y=34$

$85-35y-16y=34$

20) $-2x-y=-9$
$5x-2y=18$

$-y=-9+2x$

$y=9-2x$

$y=-2x+9$

(4, 1)

$5x-2(-2x+9)=18$

$5x+4x-18=18$

$x=4$ $y=1$

$85-34=51y$ $y=1$ $x=5$