

Solving Systems of Equations by Substitution

Solve each system by substitution.

1) $y = 6x - 11$
 $-2x - 3y = -7$
 $-2x - 3(6x - 11) = -7$
 $-2x - 18x + 33 = -7$
 $-20x + 33 = -7$
 $-20x = -40$
 $x = 2$
 $y = 6(2) - 11 = 12 - 11 = 1$
Check:
 $-2(2) - 3(1) = -7$
 $-4 - 3 = -7 \Rightarrow -7 = -7 \checkmark$
(2, 1)

2) $2x - 3y = -1$
 $y = x - 1$
 $2x - 3(x - 1) = -1$
 $2x - 3x + 3 = -1$
 $-x + 3 = -1$
 $-x = -4$
 $x = 4$
 $y = 4 - 1 = 3$
Check:
 $2(4) - 3(3) = -1$
 $8 - 9 = -1$
 $-1 = -1 \checkmark$
(4, 3)

3) $y = -3x + 5$
 $5x - 4y = -3$
 $5x - 4(-3x + 5) = -3$
 $5x + 12x - 20 = -3$
 $17x - 20 = -3$
 $17x = 17$
 $x = 1$
 $y = -3(1) + 5 = -3 + 5 = 2$
Check:
 $5(1) - 4(2) = -3$
 $5 - 8 = -3$
 $-3 = -3 \checkmark$
(1, 2)

4) $-3x - 3y = 3$
 $y = -5x - 17$
 $-3x - 3(-5x - 17) = 3$
 $-3x + 15x + 51 = 3$
 $12x + 51 = 3$
 $12x = -48$
 $x = -4$
 $y = -5(-4) - 17 = 20 - 17 = 3$
Check:
 $-3(-4) - 3(3) = 3$
 $12 - 9 = 3$
 $3 = 3 \checkmark$
(-4, 3)

5) $y = -2$
 $4x - 3y = 18$
 $4x - 3(-2) = 18$
 $4x + 6 = 18$
 $4x = 12$
 $x = 3$
Check:
 $4(3) - 3(-2) = 18$
 $12 + 6 = 18$
 $18 = 18 \checkmark$
(3, -2)

6) $y = 5x - 7$
 $-3x - 2y = -12$
 $-3x - 2(5x - 7) = -12$
 $-3x - 10x + 14 = -12$
 $-13x + 14 = -12$
 $-13x = -26$
 $x = 2$
 $y = 5(2) - 7 = 10 - 7 = 3$
Check:
 $-3(2) - 2(3) = -12$
 $-6 - 6 = -12$
 $-12 = -12 \checkmark$
(2, 3)

7) $-4x + y = 6$
 $-5x - y = 21$
 $-4x + y = 6 \Rightarrow y = 4x + 6$
 $-5x - (4x + 6) = 21$
 $-5x - 4x - 6 = 21$
 $-9x - 6 = 21$
 $-9x = 27$
 $x = -3$
 $y = 4(-3) + 6 = -12 + 6 = -6$
Check:
 $-5(-3) - (-6) = 21$
 $15 + 6 = 21$
 $21 = 21 \checkmark$
(-3, -6)

8) $-7x - 2y = -13$
 $x - 2y = 11 \Rightarrow x = 2y + 11$
 $-7(2y + 11) - 2y = -13$
 $-14y - 77 - 2y = -13$
 $-16y - 77 = -13$
 $-16y = 64$
 $y = -4$
 $x = 2(-4) + 11 = -8 + 11 = 3$
Check:
 $-7(3) - 2(-4) = -13$
 $-21 + 8 = -13$
 $-13 = -13 \checkmark$
(3, -4)

9) $-5x + y = -2$
 $-3x + 6y = -12$
 $-5x + y = -2 \Rightarrow y = 5x - 2$
 $-3x + 6(5x - 2) = -12$
 $-3x + 30x - 12 = -12$
 $27x - 12 = -12$
 $27x = 0$
 $x = 0$
 $y = 5(0) - 2 = -2$
Check:
 $-3(0) + 6(-2) = -12$
 $0 - 12 = -12$
 $-12 = -12 \checkmark$
(0, -2)

10) $-5x + y = -3$
 $3x - 8y = 24$
 $-5x + y = -3 \Rightarrow y = 5x - 3$
 $3x - 8(5x - 3) = 24$
 $3x - 40x + 24 = 24$
 $-37x + 24 = 24$
 $-37x = 0$
 $x = 0$
 $y = 5(0) - 3 = -3$
Check:
 $3(0) - 8(-3) = 24$
 $0 + 24 = 24$
 $24 = 24 \checkmark$
(0, -3)