Solving Systems Algebraically

By SUBSTITUTION

Ex 1 $5x - y = 10$

$x^2 + x - 2y = 0$

① Isolate the "y" in the simpler equation

$5x - y = 10$

$-5x \quad -5x$

$-y = -5x + 10$

$y = 5x - 10$

② Substitute what y equals into the OTHER equation

$x^2 + x - 2(5x - 10) = 0$

$x^2 + x - 10x + 20 = 0$ ③ Simplify & solve

$x^2 - 9x + 20 = 0$

$(x - 4)(x - 5) = 0$

so $x = 4$ or $x = 5$

and $y = 5x - 10$ so $(4, 10)$ or $(5, 15)$

Check: $5x - y = 10$

$5(4) - (10) \stackrel{?}{=} 10$ ✓

$5(5) - 15 \stackrel{?}{=} 10$ ✓

$x^2 + x - 2y = 0$

$(4)^2 + 4 - 2(10) \stackrel{?}{=} 0$

$16 + 4 - 20 \stackrel{?}{=} 0$ ✓

$(5)^2 + 5 - 2(15) \stackrel{?}{=} 0$

$25 + 5 - 30 \stackrel{?}{=} 0$ ✓

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AND: ① $p = 3k + 1$

$p = 6k^2 + 10k - 4$

Solving by Elimination:

- The goal is to ELIMINATE one of the variables by adding the two equations together.
- Start by writing one equation above the other and lining up like terms.

Ex: $5x-y=10$ and $x^2+x-2y=0$

$x^2+x-2y=0$

$-2(5x-y=10)$

$x^2+x-2y=0$

$-10x+2y=-20$

$x^2-9x=-20$

To eliminate the 'y's, we multiply the 2nd equation by -2

Then, solve it!

$x^2-9x+20=0$

$(x-4)(x-5)=0$

$x=4$ or 5 then go back & figure out y...

$2\left(\frac{3}{2}x^2 - \frac{1}{2}x - \frac{1}{2}y = 1\right) \Rightarrow 3x^2 - x - y = 2$

$2\left(\frac{3}{2}x^2 + 2x - \frac{1}{2}y = 2\right) \Rightarrow -1(3x^2 + 4x - y = 4)$

0 0

$3x^2 - x - y = 2$

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

$-5x = -2$

$x = \frac{2}{5}$ then go find y & check!!

Solve using elimination:

Pg 452 #4 and #5

↗ ↗

Use elim.

Use elim. or subst. → whichever you prefer.