Grade 10 Academic Math
Unit: Linear Systems

Lesson: 2-3
Topic: Solving Linear Systems by Substitution

## \# homework check: Principles of Mathematics 10 p. 26 \# 1, 3, 5, 9, 14, 18

## \# note: Solving Linear Systems using Substitution

Solving a linear system using substitution requires algebra. After rearranging one equation to isolate the variable, this new form is substituted into the second equation. Once solved, we can determine the value of the second variable by substituting back into the original equation. For example, solve these systems using substitution.
a) $x+4 y=6$
$2 x-3 y=1$
rearrange equation (1) for the variable x
$x=6-4 y$
subsitute the new form of equation (1) into equation (2)
$2(6-4 y)-3 y=1$
$12-8 y-3 y=1$
$-11 y=-11$
$y=1$
substitute $y=1$ into equation (1)
$x=6-4(1)$
$x=2$
$\operatorname{POI}(2,1)$

Sometimes rearranging is not necessary as one (or more) equation is already in a usable format.
b) $5 x-3 y-2=0$
$y=-7 x$
substitute equation (2) into equation (1)
$5 x-3(-7 x)-2=0$
$5 x+21 x=2$
$26 x=2$
$x=\frac{2}{26}$
$x=\frac{1}{13}$
substitute the value of $x=\frac{1}{13}$ back into equation (2)
$y=-7\left(\frac{1}{13}\right)$
$y=\frac{-7}{13}$
POI $\left(\frac{1}{13}, \frac{-7}{13}\right)$
Note: Not all systems have solutions. If you miss parallel systems, an answer like $0 x=$ constant might arise. Since there is no value that makes this equation true, there is no solution to the system.
\# homework assignment: Principles of Mathematics 10 p. 39 \# 4, 5, 9, 16

