Math 45 4.5 Mixture Problems with Linear Systems

Additional example for your class notes:

1) $12,000 is invested for one year. Part was invested in a money market account earning 6% simple interest and part was invested in a stock fund paying 8.5% simple interest. Tthe total interest earned was $807.50. How much money was invested in each account?

Remember the simple interest formula: $I = PRT$

Where I = amount of interest (in $)
P = amount invested (in $)
R = rate (%, rewrite as decimal)
T = time (in years).

Make a chart:

	I	$=$	P	$\cdot$	R	$\cdot$	T
money market →	$.06x$		x		$.06$		1
stock fund →	$.085y$		y		$.085$		1

multiply P·R·T

unknown variables
x = amount in money market
y = amount in stock fund

6% = .06
8.5% = .085

↑ both for 1 year

Total invested = $12000 means add:

$x + y = 12{,}000$

Total interest = $807.50 means add interest from chart:

$.06x + .085y = 807.50$ mult by 1000 to remove decimals

$60x + 85y = 807{,}500$ div by 5 to get smaller #s.

$12x + 17y = 161{,}500$
$x + y = 12{,}000$ } system of equations

Choose a method to solve. I choose substitution.

$y = 12{,}000 - x$. ← solve for y

$12x + 17(12{,}000 - x) = 161{,}500$ ← substitute

$12x + 204{,}000 - 17x = 161{,}500$ ← dist

$-5x + 204{,}000 = 161{,}500$ ← combine

$-5x = -42{,}500$ ← subtract 204,000

$x = \$8500$ in money market ← div by -5

$8500 + y = 12{,}000$ ← subst

$y = \$3500$ in stock fund ← subtract 8500