Simultaneous Equations (Elimination)

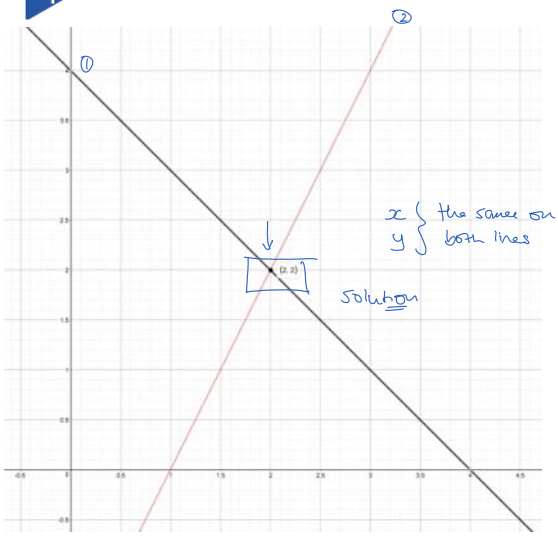
Sunday, 4 February 2018 6:03 pm

1K Simultaneous equations – elimination Let's start: *Which operation?* Key ideas 1.1 Examples 28, 29	Exercise 1K Page 62	3(½) 4-5(½) 6(½), 7, 8 10, 11(½)	– 4-5(½) 6(½), 8, 9 11, 12 13

Key questions

- What are simultaneous equations
- Why would I want to solve them?
- What do they look like?
- Solving for missing letters using elimination

recap **Remember from the last lesson ...**



Simultaneous equations are looking for us to find where two straight lines cross. At this point the x-value and y-value are the same for each equation.

There are a number of ways we can do this:

- Graphically
- Algebraically
  - Substitution
  - **Elimination**
  - Matrices (Further Mathematics and Mathematical Methods)
- Using our CAS calculator :)

Sometimes, it's hard to re-arrange equations and substitute.
It might take longer, and lead to mistakes!
So, there is another way called elimination.

What does it mean to eliminate?

Synonyms for eliminate — Common — Informal

verb remove, throw out

cancel	oust	drop	reject	do away with
defeat	phase out	eject	slay	drive out
dispose of	stamp out	evict	terminate	leave out
disqualify	waive	expel	waste	put out
eradicate	wipe out	exterminate	blot out	rub out
erase	annihilate	invalidate	bump off	rule out
exclude	discard	kill	cast out	set aside
get rid of	discharge	liquidate	count out	shut the door on
ignore	dismiss	murder	cut out	take out
knock out	disregard	omit	dispense with	

We are trying to remove two of the terms by getting them to cancel each other out ...

E.g. 1

Same value in front of one of the x – and y-term

$x + y = 5$
$2x + y = 7$

$x + y = 5$ ①
$2x + y = 7$ ②

$x = 2$

$x + y = 5$
$2 + y = 5$
$y = 3$

Soln (2, 3)

$x + y = 5$ — 2 unknowns = 2 equations

$x + y + z = 7$ — 3 unknowns = 3 eqns.

E.g. 2

Only need to multiply one of the equations

① $5x - y = 1$
$3x - 2y = -5$

$\times 2$ ① $10x - 2y = 2$ ① $\times 2$
② $3x - 2y = -5$ ② =

$7x = 7$

$x = 1$

$5x - y = 1$

Soln (1, 4)

$5(1) \quad -y = 1$

$5 - y = 1$

$y = 4$

E.g. 3 $3x + 2y = -5$
$4x - 3y = -1$

Need to multiply both equations

x

$3x + 2y = -5$ ① × 4 Everything

$4x - 3y = -1$ ② × 3

$+12x + 8y = -20$

$+12x - 9y = -3$ (−)

$17y = -17$

$y = -1$

++ } −

−+ } ⊗ +

$3x + 2y = -5$

$3x + 2(-1) = -5$

$3x - 2 = -5 \quad +2$

$3x = -3$

$x = -1$

Soln $(-1, -1)$