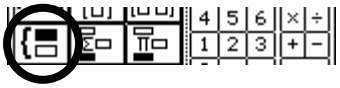
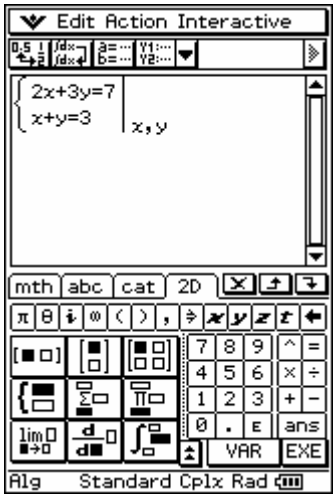
## Simultaneous equations – 2 and 3 unknowns.

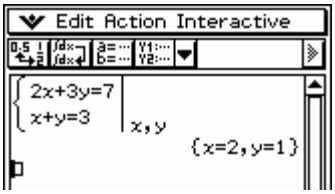
**Example of 2 equations and 2 unknowns.**
Select the 2D keyboard and then choose



Type in 2x+3y=7 then x+y=3 then x,y as shown below:




Then **EXE** for the solution




Giving the solution (x, y) = (2, 1)

**Application:**
The demand for product A is related to the cost \$x per item by a linear function given from the following figures

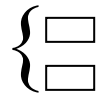
| | | | |
|---|---|---|---|
| **x** | **1** | **3** | **8** |
| **y** | **46** | **34** | **4** |

The supply for product A is related to the cost \$x per item by a linear function given from the following figures

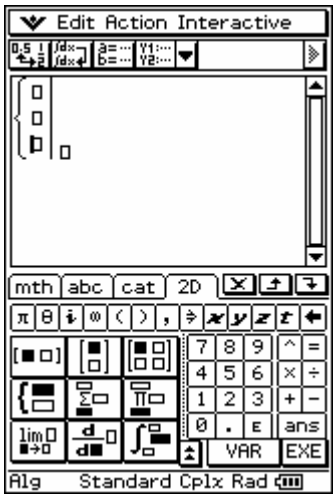
| | | | |
|---|---|---|---|
| **x** | **1** | **3** | **8** |
| **y** | **1** | **7** | **22** |

Set up a set of linear equations for determining the breakeven (equilibrium) point of supply versus demand.

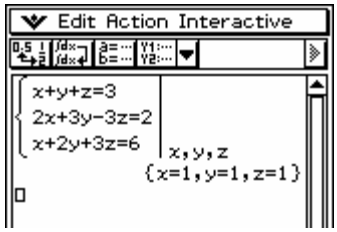
**Example of 3 equations and 3 unknowns**
Select the 2D keyboard and then choose the



picture twice.
This changes from 2 equations to 3 equations.




Solve
x + y + z = 3
2x + 3y – 3z = 2
x + 2y + 3z = 6




Yielding the solution (x, y, z) = (1, 1, 1)

**Application:**
**1.** In a card game, players take turns to pick up and put down cards.
Each card held in a particular suit scores a certain number of penalty points depending on the suit (hearts, spades or diamonds – clubs do not have any penalty points).
A player's penalty is found by adding the number of points for the cards held.
A particular game ended as follows:

- player A held 2 hearts, 1 diamond and 3 spades and has 34 penalty points
- player B held 1 heart, 4 diamonds and 5 spades and has 45 penalty points
- player C held 3 hearts, 2 diamonds and 1 spade and has 43 penalty points.

Set up and solve a system of equations to find the number of penalty points the cards in each suit receives.
**2.** Attempt to solve the system of equations
$2x - y + 3z = 17$
$x + 2y - z = -4$
$3x + y + 2z = 10$ and explain the nature of the equations.
Give a geometrical interpretation of the result.