

Problem Sheet 1

Deadline: **Monday 10 October, 5:00.**

Hand in to **the drop box** in the undergraduate common room (maths department, room 502).

Hand in the questions marked with an asterisk (*).

One mark will be deducted if you do not **staple your work.**

1) Solve the following equations:

a) $5x - 10 = 0$

d) $x^2 - x - 6 = 0$

* b) $5x - 11 = 0$

* e) $x^2 - 3x = 80 - x$

c) $x^2 - 9x - 10 = 0$

* f) $3x^2 + x - 2 = 0$

2) Solve the following equations:

a) $x^2 + 16 = 0$

* b) $x^2 + 2x + 5 = 0$

* c) $5x^2 = 2x - 1$

* d) $x^3 + 4x^2 + x - 6 = 0$ (Clue: $x = 1$ is one solution)

e) $x^3 - 5x^2 + 60x - 224 = 0$ (Clue: $x = 4$ is one solution)

* f) $x^3 - 2x^2 - 4x = 0$

* 3) Use completing the square on the equation $x^2 + 2x + c = 0$ to show that

$$x = -1 \pm \sqrt{1 - c}.$$

Challenge) Use completing the square on the equation $ax^2 + bx + c = 0$ to show that

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}.$$