on exam

## Linear - Quadratic System

April 14/14

find point (s) of intersection between a line and a parabola

parabola $y = -(x+2)^2 + 3$
line $y = x - 1$

Eg 1, solve (set equations equal to each other

$$x - 1 = -(x+2)^2 + 3$$
$$x - 1 = -(x^2 + 4x + 4) + 3$$
$$x - 1 = -x^2 - 4x - 4 + 3$$
$$0 = -x^2 - 5x$$
$$0 = x^2 + 5x$$

$$x(x+5) = 0$$
$$\underbrace{x = 0 \text{ or } x = -5}_{\text{to make } x(x+5) \text{ equal zero}}$$

But $y = x - 1$

$\therefore y = 0 - 1 = -1$ $\quad$ $y = -5 - 1 = -6$

$(0, -1)$ $\quad$ $(-5, -6)$

two intersections between line/parabola.

Ex 2 parabola $y = 2(x+3)^2 - 4$
line $y = 2/3x - 3$

solve

$$2/3x - 3 = 2(x+3)(x+3) - 4$$
$$3(2/3x - 3 = 2(x^2 + 6x + 9) - 4)$$
$$2x - 9 = 6x^2 + 36x + 54 - 12$$
$$0 = 6x^2 + 34x + 51$$

$$\frac{-34 \pm \sqrt{(34)^2 - 4(6)(51)}}{12}$$

$$\frac{-34 \pm \sqrt{1156 - 1224}}{12}$$

$\therefore$ negative under square root, so no interception.