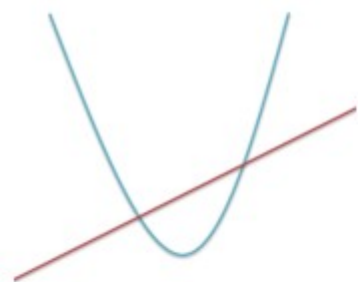


## Intersection of a straight line and a curve

If a line and a curve intersect then the coordinates at the point of intersection are the same.

I.E. If line  $y = mx + d$  intersects with  $y = ax^2 + bx + c$  then the values of  $y$  (and  $x$ ) will be equal so  $mx + d = ax^2 + bx + c$  which results in a quadratic in  $x$  that can be solved.



Example:

Find, using an algebraic method, the coordinates of the points of intersection of the curve  $y = x^2 - 6x + 14$  and the straight line  $x + y = 10$ .  
You must show all your working. [4]

Rearrange  $x + y = 10$  to give  $y = 10 - x$

Now put the 2 equations for  $y$  equal to each other

$$x^2 - 6x + 14 = 10 - x$$

$$x^2 - 5x + 4 = 0$$

$$(x - 4)(x - 1) = 0$$

$x$  coordinates are 4 and 1

When  $x = 4$   $y = 6$  and when  $x = 1$   $y = 9$

Coordinates of point of intersection are (4,6) and (1,9)