

(x, y)
same place
at the
same t!
time!

Crashing Planes – Example

Suppose two airplanes follow along the paths below: How can we tell whether or not they collide?

Airplane #1: $x(t) = t + 1$ $y(t) = t + 4$

Airplane #2: $x(t) = t + 2$ $y(t) = 3t + 4$

Eliminate the parameter in each set of equations:

Airplane #1 (as a function):

$x = t + 1$

$t = x - 1$

$y = (x - 1) + 4$

$y = x - 1 + 4$

$y = x + 3$ Plane 1.

Airplane #2 (as a function):

$x = t + 2$

$t = x - 2$

$y = 3(x - 2) + 4$

$y = 3x - 6 + 4$

$y = 3x - 2$ Plane 2.

Same Place (x, y)

$y = x + 3$ plane 1

$y = 3x - 2$ plane 2

$x + 3 = 3x - 2$

$x = 2.5$

$y = x + 3, x = 2.5$

$y = 5.5$

Find the intersection point:

What time do plane 1 and plane 2 arrive?

Place!

$(2.5, 5.5)$

Plane 1:

$(2.5, 5.5)$

$t = 1.5$

$t = x - 1$

Plane 2:

$(2.5, 5.5)$ $t = x - 2$

$t = .5$

No, they don't collide (")