

11. If $(x + iy)^2 = 8 - 6i$, find the values of x and y , $x, y \in \mathbb{R}$.

expand LHS $(a+b)^2 = a^2 + 2ab + b^2$	$(x+iy)^2 = 8-6i$ $x^2 + 2xyi + y^2i^2 = 8-6i$ $x^2 - y^2 + 2xyi = 8-6i$
Re = Re Im = Im	$x^2 - y^2 = 8$ ① $2xy = -6$ $xy = -3$ $x = -3/y$ ②
Solve simultaneous eqns Sub ① into ②	$(-3/y)^2 - y^2 = 8$ $9/y^2 - y^2 = 8$ $9 - y^4 = 8y^2$ $y^4 + 8y^2 - 9 = 0$ $(y^2 + 9)(y^2 - 1) = 0$
multiply by y^2 factorise	
Solve	$y^2 = -9$ $y^2 = +1$ $y = \pm\sqrt{-9}$ $y = \pm\sqrt{1}$ $y = \pm 3i$ $y = \pm 1$
get X values $x = -3/y$	
$y = 3i$	$x = \frac{-3}{3i} = \frac{-1}{i} = \frac{-1(-i)}{i(-i)} = \frac{i}{1} = i$
$y = -3i$	$x = \frac{-3}{-3i} = \frac{1}{i} = \frac{1(-i)}{i(-i)} = \frac{-i}{1} = -i$
$y = 1$	$x = \frac{-3}{1} = -3$
$y = -1$	$x = \frac{-3}{-1} = 3$
pairs of solutions	$x = i, y = 3i$ $x = -i, y = -3i$ $x = -3, y = 1$ $x = 3, y = -1$