

## Step-1

Given that the multiplications of two complex numbers

$(a + ib)(c + id) = (ac - bd) + i(bc + ad)$ , involves four separate multiplications  $ac$ ,  $bd$ ,  $bc$ ,  $ad$ . Ignoring  $i$ , we have to verify that can we compute  $ac - bd$  and  $bc + ad$  with only three multiplications.

## Step-2

The first term  $ac - bd$  can be calculate as  $(a - b)(c + d) - ad + bc$

It consist only one additional multiplication.

The second term  $bc + ad$  can be calculate as  $(a + b)(c + d) - ac - bd$

It consist only one additional multiplication.

So we can compute  $ac - bd$  and  $bc + ad$  with only three multiplications.