

## Division of Complex Numbers

Division of complex numbers follows the same sort of rules as the multiplication of radicals (multiplication by a conjugate to get the  $i$  out of the denominator).

$(a + bi)$  and  $(a - bi)$  and complex conjugates

$$(a + bi)(a - bi) = a^2 - abi + abi - (bi)^2 = a^2 + b^2 \quad \text{note: real number}$$

Examples:

$$\frac{1}{2+3i} = \frac{1}{2+3i} \cdot \frac{2-3i}{2-3i} = \frac{2-3i}{13} = \frac{2}{13} - \frac{3}{13}i$$

$$(2+3i)(2-3i) = 2^2 + 3^2 = 13$$

$$(1+i)(3-4i) = 3 - 4i + 3i - 4i^2 = 7 - i$$

$$\frac{1+4i}{3+4i} = \frac{1+4i}{3+4i} \cdot \frac{3-4i}{3-4i} = \frac{7-i}{25} = \frac{7}{25} - \frac{1}{25}i$$

$$(3+4i)(3-4i) = 3^2 + 4^2 = 25$$