Complex Numbers

To multiply complex numbers multiply each of the 4 parts of the complex numbers together – using Multiplication of Polynomial Rules, and remember $i^2 = -1$.

Formulas:

- (a + bi)(c + di) = (ac – bd) + (ad + cb)i From FOIL
  - (a + bi)(c + di) → ac + ad$i$ + cb$i$ + bdi^2 → ac + ad$i$ + cb$i$ + bd(-1)
- (a + bi)(a – bi) = $a^2 + b^2$ From Product of Sum and Difference

Examples:

- .
- $4i(7i) \rightarrow 28i^2 \rightarrow -28$
- $6i(2+3i) \rightarrow 6i*2 + 6i*3i \rightarrow$
  $12i + 18i^2 \rightarrow -18 + 12i$
- $(5+4i)(7+9i) \rightarrow (5*7 - 4*9) + (5*9 + 7*4)i \rightarrow -1 + 73i$
- $(3+2i)(3-2i) \rightarrow 9 + 4 \rightarrow 13$
- $(4+2i)(3-4i) \rightarrow 4*3 + 4*(-4i) + 2i*3 + 2i*(-4i) \rightarrow$
  $12 - 16i + 6i - 8i^2 \rightarrow 12 - 10i - 8(-1) \rightarrow$
  $12 - 10i + 8 \rightarrow 20 - 10i$