

## Multiplying Complex Numbers

To multiply complex numbers, multiply in the same way one multiplies polynomials. However, be sure to remember to replace  $i^2$  with  $-1$ .

Monomial times a binomial:  $3i(4i + 5) = 12i^2 + 15i = -12 + 15i$

TRY:  $-5i(3i - 4)$

Two binomials:  $(2i + 4)(3i - 5) = 6i^2 - 10i + 12i - 20 = -6 + 2i - 20 = -26 + 2i$

Use FOIL to multiply two complex numbers together. Be sure to express the answer in proper form.

TRY:  $(3i + 4)(2i - 6)$

The conjugate of  $(a + bi)$  is  $(a - bi)$ .  $(6 + 2i)$  and  $(6 - 2i)$  are examples of **complex conjugates**.

Just like multiplying together two conjugates with radicals “rationalizes” the result and removes the radical, multiplying two complex conjugates together removes the imaginary part and produces a “real” result.

$$(6 + 2i)(6 - 2i) = 36 - 12i + 12i - 4i^2 = 36 - 4i^2 = 36 - (-4) = 36 + 4 = 40$$

TRY: Multiply this complex number and its conjugate together.  $(3 - 5i)$