EX: Evaluate $\dfrac{4 + j3}{2 - j6}$

ANS: $-\dfrac{1}{4} + j\dfrac{3}{4}$

SOL'N: Multiply the numerator and denominator by the denominator's complex conjugate. This turns the denominator into a real number equal to the magnitude squared of the original denominator. Divide the numerator's real and imaginary parts by this new denominator.

$$\frac{4 + j3}{2 - j6} = \frac{4 + j3}{2 - j6}\frac{(2 - j6)*}{(2 - j6)*}$$

$$= \frac{4 + j3}{2 - j6}\frac{2 + j6}{2 + j6}$$

$$= \frac{8 - 18 + j(6 + 24)}{4 + 36}$$

$$= \frac{-10 + j30}{40}$$

$$= -\frac{1}{4} + j\frac{3}{4}$$