3.5: Complex Numbers

Supplementary Notes

A *complex number* has the form $a + bi$, where $i^2 = -1$. The *conjugate* of $a + bi$ is $a - bi$.

The powers of $i = \sqrt{-1}$ follow the pattern

$$\boxed{\begin{array}{rcccl} i^{2n} & = & (i^2)^n & = & (-1)^n \\ i^{2n+1} & = & i^{2n} \cdot i & = & (-1)^n \cdot i \end{array}}$$

OR

$$\boxed{\begin{array}{rcl} i^{4n} & = & 1 \\ i^{4n+1} & = & i \\ i^{4n+2} & = & -1 \\ i^{4n+3} & = & -i \end{array}}$$

where n is an integer.