

Complex Numbers

$$\begin{array}{ll}
 i = \sqrt{-1} & i^3 = -i \\
 i^2 = -1 & i^4 = 1
 \end{array}$$

add & subtract * i works ~ to x

$$\text{ex1} \quad (3-5i) + (6+2i)$$

$$\boxed{9+3i}$$

$$\text{ex2} \quad (4+3i) - (5-4i)$$

$$4+3i-5+4i$$

$$= \boxed{-1+7i}$$

multiply * $i^2 = -1$

$$\text{ex3} \quad (7-6i)(4+3i) \text{ FOIL}$$

$$28 + 21i - 24i - 18i^2$$

$$= 28 - 3i + 18$$

$$= \boxed{46-3i}$$

$$\text{ex4} \quad (2i)(6-5i)$$

$$12i - 10i^2$$

$$= \boxed{12i+10}$$

divide * complex conjugate

$$(4+i) \rightarrow (4-i)$$

$$(2i+7) \rightarrow (-2i+7)$$

$$\text{ex5} \quad \frac{6}{3+2i} \left(\frac{3-2i}{3-2i} \right)$$

$$= \frac{18-12i}{9+6i-6i-4i^2}$$

$$= \boxed{\frac{18-12i}{13}}$$

$$\text{ex7} \quad \frac{5-2i}{4+3i} \left(\frac{4+3i}{4+3i} \right)$$

$$= \frac{20-8i+15i-6i^2}{16-12i+12i-9i^2}$$

$$= \frac{20+7i+6}{16+9}$$

$$= \boxed{\frac{26+7i}{25}}$$

$$\text{ex8} \quad \text{complex conjugate of } (i+\sqrt{3})$$

$$(-i+\sqrt{3})(i+\sqrt{3})$$