

Operations with Complex Numbers

A2

add / subtract / combine

combine: 1. $2 + 3i + 4 = 6 + 3i$
2. $2 - 3i - 7i + 8 = 10 - 10i$

add: 1. $(3 + 5i) + (2 + 7i)$
* ignore ()
 $= 3 + 5i + 2 + 7i$
 $= 5 + 12i$

subtract: 1. $(2 - 3i) - (4 + 2i)$
* ignore 1st (), multiply 2nd by -1
 $= 2 - 3i - 4 - 2i$
 $= -2 - 5i$

multiply

ex1 $2i(4 + 8i)$
 $8i + 16i^2$ * remember $i^2 = -1$
 $8i + 16(-1)$
 $8i - 16$

ex2 $(2i + 3)(i - 4)$ * FOIL
 $2i^2 + 3i - 8i - 12$
 $2(-1) - 5i - 12$
 $-14 - 5i$

i problems

$$i^3 = i^2 \cdot i = -i$$

$$i^{10} = i^8 \cdot i^2 = (i^2)^4 \cdot i^2$$
$$= (-1)^4 \cdot (-1)$$
$$= -1$$

square root reduce

$$\sqrt{-50} - \sqrt{-8}$$
$$\sqrt{-1} \sqrt{25} \sqrt{2} - \sqrt{-1} \sqrt{4} \sqrt{2}$$
$$5i\sqrt{2} - 2i\sqrt{2}$$
$$\boxed{3i\sqrt{2}}$$

* can combine because both $\sqrt{2}$

ex $\sqrt{-27} - \sqrt{-108}$