Combining complex #s

$a + bi$
(a: real, bi: imaginary)
complex #

add/sub i ~ x's combine like terms

ex1 $(3+4i)+(7-i)$
$= 3+4i+7-i$
$= 10+3i$

ex2 $(5-3i)-(3+7i)$
$= 5-3i-3-7i$
$= 2-10i$

ex3 $6(5i+9)+7i$
$= 30i+54+7i$
$= 54+37i$

ex4 $10(5-2i)-3(15-3i)$
$= 50-20i-45+7i$
$= 5-11i$

multiply $*i^2=-1$

ex5 $(5+6i)(2-4i)$
$= 10-20i+12i-24i^2$
$= 10-8i-24(-1)$
$= 10-8i+24$
$= 34-8i$

ex6 $(2-3i)(2+3i)$ ← *these are complex conjugates
$= 4+6i-6i-9i^2$
$= 4-9(-1)$
$= 4+9$
$= \boxed{13}$

ex7 $(9+6i)^2 = (9+6i)(9+6i)$
$= 81+54i+54i+36i^2$
$= 81+108i-36$
$= 45+108i$

divide * denominator can't have i

Complex conjugate : switch sign of i

ex 8

$$\frac{5}{4-i}\left(\frac{4+i}{4+i}\right)$$

$$= \frac{20+5i}{16+4i-4i-i^2}$$

$$= \frac{20+5i}{16+1}$$

$$= \frac{20+5i}{17}$$

ex 9

$$\frac{10+2i}{5i}\left(\frac{-5i}{-5i}\right)$$

$$= \frac{-50i-10i^2}{-25i^2}$$

$$= \frac{-50i+10}{25}$$ } all have 5

$$= \frac{-10i+2}{5}$$

ex 10

$$\frac{6+i}{4+2i}\left(\frac{4-2i}{4-2i}\right)$$

$$= \frac{24+4i-12i-2i^2}{16-8i+8i-4i^2}$$

$$= \frac{24-8i+2}{16+4}$$

$$= \frac{26-8i}{20}$$

$$= \frac{13-4i}{10}$$