Adding and Subtracting Complex Numbers ✓

Write each of the following complex numbers in the form $a + bi$:

(i) $(3 + 4i) + (5 + i)$ (ii) $(3 - 4i) + (2 - 6i)$

Add Real to Real parts and Imaginary to Imaginary parts.

(i) $3+4i + 5+i$

$= 8 + 5i$

(ii) $3 - 4i + 2 - 6i$

$5 - 10i$

Multiplying (Expanding)

Express each of the following in the form $a + bi$:

7. $(1 - 3i)(4 + 2i)$ **8.** $(1 - 4i)(1 + i)$

Just like algebra!

$i^2 = -1$

7. $(1 - 3i)(4 + 2i)$

$1(4 + 2i) - 3i(4 + 2i)$

$4 + 2i - 12i \pm 6i^2$

$10 - 10i$

OR

	1	$-3i$
4	4	$-12i$
$+2i$	$2i$	$\pm 6i^2$

$10 - 10i$

"$\bar{z}$ bar" = conjugate

Change Im Sign

Conjugate

$z = a + bi$

$\bar{z} = a - bi$

$w = 2 - 3i$

$\bar{w} = 2 + 3i$

$z = -2i$

$\bar{z} = +2i$

4. Express each of the following in the form $a + bi$:

(i) $\frac{2}{3-2i}$ (ii) $\frac{5}{3-4i}$ (iii) $\frac{3}{6-i}$ (iv) $\frac{2+3i}{1-2i}$

Rationalise the denominator

TRICK: multiply above and below by the conjugate of the denominator.

$(a+b)(a-b) = a^2 - b^2$

(i) $\frac{(2)(3+2i)}{(3-2i)(3+2i)}$ ← D.O.T.S.

$= \frac{6+4i}{(3)^2-(2i)^2}$

$= \frac{6+4i}{9+4}$

$= \frac{6+4i}{13}$

$= \frac{6}{13} + \frac{4i}{13}$

4. Express each of the following in the form $a + bi$:

(i) $\frac{2}{3-2i}$ (ii) $\frac{5}{3-4i}$ (iii) $\frac{3}{6-i}$ (iv) $\frac{2+3i}{1-2i}$

Rationalise the denominator

TRICK: multiply above and below by the conjugate of the denominator.

$(a+b)(a-b) = a^2 - b^2$

(iv) $\frac{(2+3i)(1+2i)}{(1-2i)(1+2i)}$ ← D.O.T.S.

$= \frac{2(1+2i)+3i(1+2i)}{1+4}$

$= \frac{2+4i+3i+6i^2}{5}$

$= \frac{-4+7i}{5}$

$= \frac{-4}{5} + \frac{7i}{5}$