

No Calculators!!

Simplify

1. $\frac{(2-5i)^{-1}}{(i)^{-1}}$

$= \frac{-2i + 5(i)^2}{1} = \boxed{-2i - 5}$
OR $\boxed{-5 - 2i}$

2. $(2-7i)(3+i) = 6 + 2i - 21i - 7(i)^2$
 $= 6 - 19i + 7 = \boxed{13 - 19i}$

3. Simplify $z = 3 + \frac{10i}{4+3i}$ and write $z = a + bi$ where $a, b \in R$

$z = 3 + \frac{10i(4-3i)}{(4+3i)(4-3i)} = 3 + \frac{40i + 30}{4^2 + 3^2} = 3 + \frac{40i + 30}{25}$
 $= 3 + \frac{8i}{5} + \frac{6}{5} = \frac{15}{5} + \frac{8i}{5} + \frac{6}{5} = \boxed{\frac{21}{5} + \frac{8i}{5}}$

4. Solve for x and y : $2 - yi = 8x + (2+i)y$

$2 - yi = 8x + 2y + yi$

$8x + 2y = 2$ $-2y = 0$ $\boxed{y = 0}$

$\boxed{x = \frac{1}{4}}$

5. Write the equation, $2x^2 + Bx + C$, that have a root of $4 - 5i$.

Sum: $(4-5i) + (4+5i) = 8 \rightarrow \frac{-B}{2} = 8$ $\boxed{B = -16}$

product: $(4-5i)(4+5i) = 16 + 25 = 41$ $\frac{C}{2} = 41$

$C = 82.$

$\Rightarrow \boxed{2x^2 - 16x + 82 = 0}$