The imaginary number i is a radical (it equals $\sqrt{-1}$), so it can't stay in the denominators of fractions. What should we do if we see i in the denominator of a fraction?

If there is **exactly one** term – multiply with $\frac{i}{i}$

<u>Example 1</u> Simplify $\frac{-5+2i}{6i}$

There is exactly one term ($6i$) in the denominator, so we will multiply by $\frac{i}{i}$.

$$\frac{-5+2i}{6i} \bullet \frac{i}{i} = \frac{-5i+2\boldsymbol{i^2}}{6\boldsymbol{i^2}} = \frac{-5i+2(\mathbf{-1})}{6(\mathbf{-1})} = \frac{-5i-2}{-6} = \frac{-1(5i+2)}{-6}$$

$$\boxed{\frac{\mathbf{2+5}\boldsymbol{i}}{\mathbf{6}}}$$

If there are **two** terms – use the conjugate

If the original is…,	then the conjugate is…
$5+3i$	$5-3i$
$2-8i$	$2+8i$
$\sqrt{10}+4i$	$\sqrt{10}-4i$

Example 2 Simplify $\frac{3+2i}{6-5i}$

The denominator is $6-5i$, so the conjugate is $6+5i$.

$$\frac{3+2i}{6-5i}\bullet\frac{6+5i}{6+5i}=\frac{18+15i+12i+10i^2}{36+30i-30i-25i^2}=\frac{18+27i+10(-1)}{36-25(-1)}=$$

The terms with ***i*** in them will "drop out" because they add to zero… that's why we use the conjugate!

$$\frac{18+27i-10}{36+25}=\frac{8+27i}{51}$$

$$\boxed{\frac{\mathbf{8+27}\boldsymbol{i}}{\mathbf{51}}}$$