$$\mathbf{a}+\mathbf{b}=\langle 12+(-5),6+(3)\rangle=\langle 18,-2\rangle$$
$$2\mathbf{a}+3\mathbf{b}=\langle 24,-10\rangle+\langle 18,9\rangle=\langle 42,-1\rangle$$
$$|\mathbf{a}|=\sqrt{12^2+(-5)^2}=\sqrt{169}=13$$
$$\begin{aligned}|\mathbf{a}-\mathbf{b}| &= |\langle 12-(6),-5-(3)\rangle|=|\langle 6,-8\rangle| \\ &= \sqrt{6^2+(-8)^2}=\sqrt{100}=10\end{aligned}$$