Find the angle between the vectors $i - 2j + 3k$ & $3i - 2j + k$.

Let $\vec{a} = i - 2j + 3k$ $\quad\quad$ $\vec{b} = 3i - 2j + k$

$\vec{a} \cdot \vec{b} = (i - 2j + 3k) \cdot (3i - 2j + k) = 3 + 4 + 3 = 10$

$|\vec{a}| = \sqrt{1^2 + (-2)^2 + 3^2} = \sqrt{14}$

$|\vec{b}| = \sqrt{3^2 + 2^2 + 1^2} = \sqrt{14}$

Let θ be angle between $\vec{a}$ & $\vec{b}$ then $\cos\theta = \dfrac{\vec{a} \cdot \vec{b}}{|\vec{a}|\,|\vec{b}|} = \dfrac{10}{\sqrt{14}\sqrt{14}} = \dfrac{10}{14}$

$\cos\theta = \dfrac{5}{7}$ $\quad$ $\theta = \cos^{-1}\dfrac{7}{5}$