

TG 4 Find the angle between the line joining (1, 2) and (3, -5) and the line joining (2, -3) to (1, 4).

Consider \vec{u} = vector between (1, 2) and (3, -5)
and \vec{v} = vector between (2, -3) to (1, 4).

$$\begin{aligned}\therefore \vec{u} &= (3 - 1)\vec{i} + (-5 - 2)\vec{j} \\ &= 2\vec{i} - 7\vec{j}\end{aligned}$$

$$\begin{aligned}\text{Also, } \vec{v} &= (1 - 2)\vec{i} + (4 + 3)\vec{j} \\ &= -\vec{i} + 7\vec{j}\end{aligned}$$

$$\begin{aligned}\cos \theta &= \frac{\vec{u} \cdot \vec{v}}{|\vec{u}| |\vec{v}|} \\ &= \frac{2 \times -1 + (-7) \times 7}{\sqrt{2^2 + (-7)^2} \sqrt{(-1)^2 + 7^2}} \\ &= \frac{-51}{\sqrt{53} \sqrt{50}} \\ &= -0.9907\dots\end{aligned}$$

For acute angle,

$$\cos \theta = 0.9907\dots$$

$$\therefore \theta = 8^\circ \text{ (nearest degree).}$$

* These solutions have been provided by [projectmaths](http://projectmaths.com.au) and are not supplied or endorsed by NESA.

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