Math 2339: Quiz 2 - Dot product

For the vectors \(a = (4, 5)\) and \(b = (2, 1)\) compute the following:

(1) [4 pts]
\[
a \cdot b = 4 \cdot 2 + 5 \cdot 1 = 8 + 5 = 13
\]

(2) [2 pts]
Is \(a\) orthogonal to \(b\)?

\[a \cdot b \neq 0 \quad \text{NO}\]

(3) [4 pts]
What is the angle between the vectors \(a\) and \(b\)?

\[
\cos \theta = \frac{a \cdot b}{|a| |b|} = \frac{13}{\sqrt{4^2 + 5^2} \sqrt{2^2 + 1^2}} = \frac{13}{\sqrt{41} \sqrt{5}} = \frac{13}{\sqrt{205}}
\]

\[
\theta = \arccos \left( \frac{13}{\sqrt{205}} \right)
\]