47 (a) $\mathbf{a} \bullet \mathbf{b} = (1)(3) + (-2)(1) = 3 - 2 = 1$

(b) $\|\mathbf{a}\| = \sqrt{1^2 + (-2)^2} = \sqrt{1+4} = \sqrt{5}$, $\|\mathbf{b}\| = \sqrt{3^2 + 1^2} = \sqrt{9+1} = \sqrt{10}$

$$\theta = \cos^{-1}\left(\frac{\mathbf{a} \bullet \mathbf{b}}{\|\mathbf{a}\|\|\mathbf{b}\|}\right) = \cos^{-1}\left(\frac{1}{\sqrt{5}\sqrt{10}}\right) = \cos^{-1}\left(\frac{1}{\sqrt{50}}\right) \approx 81.9°$$

(c) The vectors are neither parallel nor perpendicular.