53 (a) $\mathbf{a} \cdot \mathbf{b} = (1)(0.5) + (3)(-1.5) = 0.5 - 4.5 = -4$

(b) $\|\mathbf{a}\| = \sqrt{1^2 + 3^2} = \sqrt{1+9} = \sqrt{10}$, $\|\mathbf{b}\| = \sqrt{0.5^2 + (-1.5)^2} = \sqrt{0.25 + 2.25} = \sqrt{2.5}$

$$\theta = \cos^{-1}\left(\frac{\mathbf{a} \cdot \mathbf{b}}{\|\mathbf{a}\| \|\mathbf{b}\|}\right) = \cos^{-1}\left(\frac{-4}{\sqrt{10}\sqrt{2.5}}\right) = \cos^{-1}\left(\frac{-4}{\sqrt{25}}\right) = \cos^{-1}\left(\frac{-4}{5}\right) \approx 143.1°$$

(c) The vectors are neither parallel nor perpendicular.