Vector Components

1. a) Let \( \mathbf{A} = \langle 1, 3 \rangle \) and \( \mathbf{B} = \langle 3, 4 \rangle \).
   (i) Find the component of \( \mathbf{A} \) in the direction of \( \mathbf{B} \).
   (ii) Find the component of \( \mathbf{B} \) in the direction of \( \mathbf{A} \).

b) Let \( \mathbf{A} = \langle 3, 5, 7 \rangle \) and \( \mathbf{B} = \langle 3, 4, 0 \rangle \). Find the component \( \mathbf{A} \) in the direction of \( \mathbf{B} \).

2. Let \( \mathbf{A} = \langle a, 2 \rangle \) and \( \mathbf{B} = \langle 1, 3 \rangle \). For what values of \( a \) is the component of \( \mathbf{A} \) along \( \mathbf{B} \) equal to 0? For what \( a \) is it negative?

3. For which angle \( \theta \) is the component of \( \mathbf{A} \) in the direction of \( \mathbf{B} \) equal to 0.