

Show all work. 5 points each.

1. Let $\mathbf{a} = \langle -1, -4 \rangle$ and $\mathbf{b} = \langle 6, -2 \rangle$:

(i) Find $|\mathbf{a} + \mathbf{b}|$.

(ii) Illustrate (draw) the associated triangle (or parallelogram) formed by $\mathbf{a} + \mathbf{b}$, \mathbf{a} and \mathbf{b} .

2. (i) Find $orth_{\mathbf{a}}\mathbf{b} = \mathbf{b} - \frac{\mathbf{a} \cdot \mathbf{b}}{|\mathbf{a}|^2}\mathbf{a}$ if $\mathbf{a} = \langle 5, 0 \rangle$ and $\mathbf{b} = \langle 3, -4 \rangle$. **Again: Show all work.**

(1pt Extra credit) What is the area of the parallelogram formed by $\mathbf{a} + \mathbf{b}$, \mathbf{a} and \mathbf{b} from problem 2 ?