

MATH 251 - QUIZ 1

NAME:

I.D.:

**Instruction:** Circle your answers and show all your work CLEARLY. Solutions with answer only and without supporting procedures will have little credit.

1. Let  $\mathbf{a} = \mathbf{i} - 2\mathbf{j} + 3\mathbf{k}$  and  $\mathbf{b} = \mathbf{i} + 3\mathbf{j} - 2\mathbf{k}$ .
  - (1A) Compute  $3\mathbf{a} + 4\mathbf{b}$ .
  - (1B) Compute  $(\mathbf{a} + \mathbf{b}) \cdot (\mathbf{a} - \mathbf{b})$ .
  - (1C) Find  $x$  such that  $\mathbf{c} = \mathbf{i} + \mathbf{j} + x\mathbf{k}$  is perpendicular to the vector  $\mathbf{a} + \mathbf{b}$ .
  - (1D) Find the components  $Comp_{\mathbf{a}}\mathbf{b}$  and  $Comp_{\mathbf{b}}\mathbf{a}$ .
  - (1E) Find the direction cosines (also called directional numbers) of  $\mathbf{a}$ .