## **Review Problems**

January 13, 2017

- 1. (Fall 2004, Exam 1, #4) If  $\theta$  is the angle between  $\mathbf{i} + \mathbf{j} \mathbf{k}$  and  $2\mathbf{i} \mathbf{j}$ , then find  $\cos^2 \theta$ .
- 2. (Fall 2004, Exam 1, #5) Find the scalar projection of  $\mathbf{b} = \langle 1, -1, 1 \rangle$  onto  $\mathbf{a} = \langle 2, 1, 2 \rangle$ .
- 3. (Fall 2006, Exam 1, #4) Let  $\vec{a} = (-5, 4, 3)$  and  $\vec{b} = (-1, -1, -2)$ . Which of the following are true?
  - I.  $\operatorname{comp}_{\vec{a}}\vec{b} = -5/\sqrt{50}$
  - II.  $\operatorname{comp}_{\vec{b}}\vec{a} = -5/\sqrt{50}$
  - III.  $\operatorname{comp}_{\vec{b}}\vec{a} = -5/\sqrt{6}$
  - IV.  $\operatorname{comp}_{\vec{a}}\vec{b} = -5/\sqrt{6}$
- 4. (Fall 2007, Exam 1, #5) Sal, the mule, hauls a barge up the Erie Canal. A rope is attached to the barge at an angle of 30 degrees to the direction of the canal, and Sal pulls the rope with a force of magnitude F as she trots along. Supposing they cover distance D, how much work is done by Sal?
- 5. (Fall 2008, Exam 1, #4) Evaluate<br/>  $(\vec{i}+\vec{j}+\vec{k})\cdot(\vec{i}-2\vec{j}-2\vec{k})$
- 6. (Fall 2009, Exam 1, #2) Find  $\text{proj}_{\mathbf{a}}\mathbf{b}$  where  $\mathbf{a} = \langle -1, -1, 2 \rangle$  and  $\mathbf{b} = \langle 2, 2, -1 \rangle$ .
- 7. (Fall 2009, Exam 1, #5) A force  $\mathbf{F} = \mathbf{i} + 4\mathbf{j} 2\mathbf{k}$  is applied to an object that moves from the point P(1, 2, 0) to the point Q(0, 5, 4). Find the work done.