

Quiz 3 (20 pts.),                      Name: \_\_\_\_\_

1. **10 pts.** Given the vectors  $\mathbf{a} = \mathbf{e}_1$  and  $\mathbf{b} = \mathbf{e}_2$ , solve the linear equation

$$\mathbf{a}x + \mathbf{b} = 0$$

for  $x$ .

**Answer:**  $x = -\mathbf{a}^{-1}\mathbf{b} = -\mathbf{e}_{12}$ .

2. **10 pts.** Given the three vectors  $\mathbf{a} = \mathbf{e}_1$ ,  $\mathbf{b} = \mathbf{e}_2$ , and  $\mathbf{c} = \mathbf{e}_3$  solve the quadratic equation

$$\mathbf{a}x^2 + \mathbf{b}x + \mathbf{c} = 0$$

for  $x$ .

**Answer:**  $x^2 + \mathbf{a}^{-1}\mathbf{b}x + \mathbf{a}^{-1}\mathbf{c} = 0$  or

$$x = \frac{-\mathbf{a}^{-1}\mathbf{b} \pm \sqrt{(\mathbf{a}^{-1}\mathbf{b})^2 - 4\mathbf{a}^{-1}\mathbf{c}}}{2}$$

which is valid iff  $x\mathbf{a}^{-1}\mathbf{b} = \mathbf{a}^{-1}\mathbf{b}x$ .