

Name: _____

Quiz 1 Solutions

This is a take-home quiz. You are allowed to use your class notes and text, but no other resources (including books, internet, or people). This is due in class on Thursday, August 28. No late submissions will be accepted.

Please write up your solutions to the following homework exercises. You should write legibly and fully explain your work. Staple your pages together with this page as the cover – remember to write your full name at the top.

Exercises:

Section 1.1: # 5 a, 12, 18, 21

Section 1.3: # 6

Solutions:*Section 1.1:*

(5a) We compute

$$\overrightarrow{AB} = [4 - 1, 2 - (-1)] = [3, 3].$$

The drawings for this exercise can be found at the back of your text (pages 671 - 672).

(12)

$$\begin{aligned} 2\mathbf{c} - 3\mathbf{b} - \mathbf{d} &= 2[1, -2, 1] - 3[3, 2, 1] - [-1, -1, -2] \\ &= [2, -4, 2] + [-9, -6, -3] + [1, 1, 2] \\ &= [2 - 9 + 1, -4 - 6 + 1, 2 - 3 + 2] \\ &= [-6, -9, 1] \end{aligned}$$

(18)

$$\begin{aligned} \mathbf{x} + 2\mathbf{a} - \mathbf{b} &= 3(\mathbf{x} + \mathbf{a}) - 2(2\mathbf{a} - \mathbf{b}) \\ \implies \mathbf{x} + 2\mathbf{a} - \mathbf{b} &= 3\mathbf{x} + 3\mathbf{a} - 4\mathbf{a} + 2\mathbf{b} \\ \implies \mathbf{x} + 2\mathbf{a} - \mathbf{b} &= 3\mathbf{x} - \mathbf{a} + 2\mathbf{b} \\ \implies -2\mathbf{x} &= -3\mathbf{a} + 3\mathbf{b} \\ \implies \mathbf{x} &= \frac{3}{2}\mathbf{a} - \frac{3}{2}\mathbf{b} = \frac{3}{2}(\mathbf{a} - \mathbf{b}) \end{aligned}$$

(21) A complete solution to this exercise can be found at the back of your text (page 672).

Section 1.3:

(6) (a) The vector equation $\mathbf{x} = \mathbf{p} + t\mathbf{d}$ is

$$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 3 \\ 0 \\ -2 \end{bmatrix} + t \begin{bmatrix} 0 \\ 2 \\ 5 \end{bmatrix}.$$

(b) The parametric form is

$$\begin{aligned} x &= 3 \\ y &= 2t \\ z &= -2 + 5t. \end{aligned}$$