Linear Algebra 4.1 Homework

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7. $\langle 1, 3 \rangle + \langle 2, -2 \rangle = \langle 3, 1 \rangle$
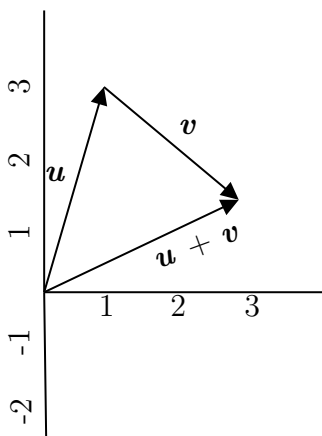

Figure 1: Problem 7 Figure

11. $\overrightarrow{\mathbf{v}} = \frac{3}{2} \overrightarrow{\mathbf{u}} \Rightarrow \frac{3}{2} \langle -2, 3 \rangle = \langle -3, \frac{9}{2} \rangle$
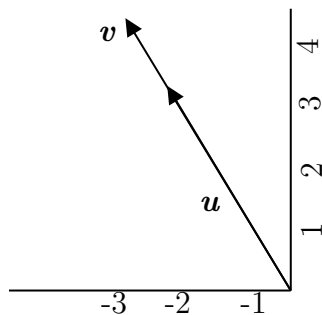
Figure 2: Problem 11 Figure

19. (a) $\overrightarrow{\mathbf{u}} - \overrightarrow{\mathbf{v}} = \langle 1, 2, 3 \rangle - \langle 2, 2, -1 \rangle = \langle -1, 0, 4 \rangle$

(b) $\vec{v} - \vec{u} = \langle 2, 2, -1 \rangle - \langle 1, 2, 3 \rangle = \langle 1, 0, -4 \rangle$

21. $2\vec{u} + 4\vec{v} - \vec{w} = 2\langle 1, 2, 3 \rangle + 4\langle 2, 2, -1 \rangle - \langle 4, 0, -4 \rangle = \langle 6, 12, 6 \rangle$

24. $\vec{z} = -\frac{2\vec{u} + \vec{v} - \vec{w}}{3} \Rightarrow -\frac{1}{3}\left(2\langle 1, 2, 3 \rangle + \langle 2, 2, -1 \rangle - \langle 4, 0, -4 \rangle\right) = \langle 0, -2, -3 \rangle$

29. (a) $\vec{u} - \vec{v} = \langle 4, 0, -3, 5 \rangle - \langle 0, 2, 5, 4 \rangle = \langle 4, -2, -8, 1 \rangle$

   (b) $2\vec{u} + 6\vec{v} = 2\langle 4, 0, -3, 5 \rangle + 6\langle 0, 2, 5, 4 \rangle = \langle 8, 12, 24, 34 \rangle$

   (c) $2\vec{v} - \vec{u} = 2\langle 0, 2, 5, 4 \rangle - \langle 4, 0, -3, 5 \rangle = \langle -4, 4, 13, 3 \rangle$

35. $\vec{w} = \frac{1}{3}(\vec{u} - 2\vec{v}) = \frac{1}{3}\left(\langle 1, -1, 0, 1 \rangle - 2\langle 0, 2, 3, -1 \rangle\right) = \langle \frac{1}{3}, -\frac{5}{3}, -2, 1 \rangle$

41. $\vec{v} = \vec{u} + \vec{w}$

49. $c_1\langle 1, 1, 2, 2 \rangle + c_2\langle 2, 3, 5, 6 \rangle + c_3\langle -3, 1, -4, 2 \rangle = \langle 0, 5, 3, 0 \rangle$. Such a combination is not possible.

55. Such a combination is not possible (although number 56 is)