Section 1.3 Exercises

32. In $\mathbb{R}^2$
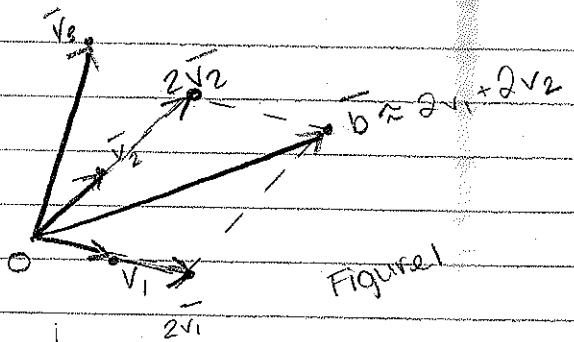

Figure 1

The equation $x_1 \overline{v_1} + x_2 \overline{v_2} + x_3 \overline{v_3} = b$ does have a solution in $\mathbb{R}^2$ because you can have a vector twice as long as v_1 and twice as long as v_2 that when added together, using the Parallelogram Law, equals vector $\overline{b}$ as shown in the figure 1 above.
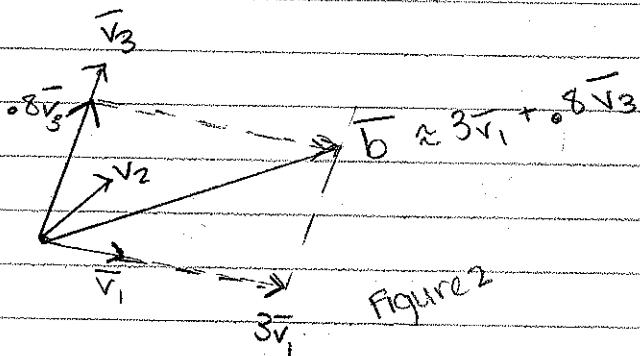

Figure 2

There is not a unique solution to the equation $x_1 \overline{v_1} + x_2 \overline{v_2} + x_3 \overline{v_3} = b$ in $\mathbb{R}^2$ because there is more than one way to combine the vectors $\overline{v_1}, \overline{v_2}$, and v_3 to get vector $\overline{b}$. A second solution is shown in figure 2 above where $3\overline{v_1} + .8\overline{v_3} = \overline{b}$.