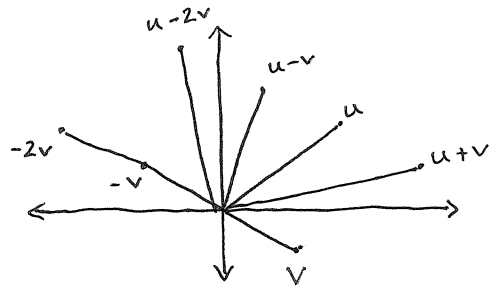


Sect 1.3
Answer key

1. $\begin{bmatrix} -4 \\ 1 \end{bmatrix}, \begin{bmatrix} 5 \\ 4 \end{bmatrix}$

4.



5.
$$\begin{cases} 6x_1 - 3x_2 = 1 \\ -x_1 + 4x_2 = -7 \\ 5x_1 = -5 \end{cases}$$

6.
$$\begin{cases} -2x_1 + 8x_2 + x_3 = 0 \\ 3x_1 + 5x_2 - 6x_3 = 0 \end{cases}$$

7.
$$\begin{aligned} a &= u - 2v \\ b &= 2u - 2v \\ c &= 2u - 3.5v \\ d &= 3u - 4v \end{aligned}$$

9.
$$x_1 \begin{bmatrix} 0 \\ 4 \\ -1 \end{bmatrix} + x_2 \begin{bmatrix} 1 \\ 6 \\ 3 \end{bmatrix} + x_3 \begin{bmatrix} 5 \\ -1 \\ -8 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$$

10.
$$x_1 \begin{bmatrix} 4 \\ 1 \\ 8 \end{bmatrix} + x_2 \begin{bmatrix} 1 \\ -7 \\ 6 \end{bmatrix} + x_3 \begin{bmatrix} 3 \\ -2 \\ -5 \end{bmatrix} = \begin{bmatrix} 9 \\ 2 \\ 15 \end{bmatrix}$$

11. yes

12. No

18. $h = -7/2$

21. want $\begin{bmatrix} 2 \\ -1 \end{bmatrix} c_1 + \begin{bmatrix} 2 \\ 1 \end{bmatrix} c_2 = \begin{bmatrix} h \\ k \end{bmatrix}$

$\Rightarrow \begin{bmatrix} 2 & 2 & h \\ -1 & 1 & k \end{bmatrix} \xrightarrow{\text{rref}} \begin{bmatrix} 1 & 0 & \frac{1}{4}h - \frac{1}{2}k \\ 0 & 1 & \frac{1}{4}h + \frac{1}{2}k \end{bmatrix}$

So, h & k can be anything they want

23. a) true; the 1st is a column vector, the 2nd is a row vector

24. a) true

b) true

c) true; $\frac{1}{2}v_1 = \frac{1}{2}v_1 + 0 \cdot v_2$

d) true

e) ~~only if~~ false

25. a) No, 3

b) yes, infinitely many

c) $a_1 = 1 \cdot a_1 + 0 \cdot a_2 + 0 \cdot a_3$

27. a) $5v_1 =$ output of 5 day's operation of mine #1

b) want x_1 & x_2 to satisfy:

$$x_1 \bar{v}_1 + x_2 \bar{v}_2 = \begin{bmatrix} 150 \\ 2825 \end{bmatrix}$$

c) mine #1 : 1.5 days

mine #2 : 4 days