

In[1]:= **va1 = {4, 2, 2, 1}; va2 = {-1, 8, 4, 5}; va3 = {-7, 7, 8, 5}**

Out[1]= { - 7, 7, 8, 5 }

In[2]:= **vv1 = va1**

Out[2]= { 4, 2, 2, 1 }

In[3]:= **vv2 = va2 - $\frac{va2.vv1}{vv1.vv1} vv1$**

Out[3]= { - 5, 6, 2, 4 }

In[4]:= **vv3 = va3 - $\frac{va3.vv1}{vv1.vv1} vv1 - \frac{va3.vv2}{vv2.vv2} vv2$**

Out[4]= $\left\{ -\frac{2318}{2025}, -\frac{1303}{675}, \frac{9416}{2025}, -\frac{1742}{2025} \right\}$

In[5]:= **vv1.vv2**

Out[5]= 0

In[6]:= **vv1.vv3**

Out[6]= 0

In[7]:= **vv2.vv3**

Out[7]= 0

In[8]:= **Norm[vv1]**

Out[8]= 5

In[9]:= **Norm[vv2]**

Out[9]= 9

In[10]:= **Norm[vv3]**

Out[10]= $\frac{\sqrt{55481}}{45}$

In[11]:= **Norm[vv1] Norm[vv2] Norm[vv3]**

Out[11]= $\sqrt{55481}$

In[12]:= **Transpose[{va1, va2, va3}] // MatrixForm**

Out[12]//MatrixForm=

$$\begin{pmatrix} 4 & -1 & -7 \\ 2 & 8 & 7 \\ 2 & 4 & 8 \\ 1 & 5 & 5 \end{pmatrix}$$

In[13]:= **mA = Transpose[{va1, va2, va3}]**

Out[13]= {{4, -1, -7}, {2, 8, 7}, {2, 4, 8}, {1, 5, 5}}

In[*]:= **Det [Transpose [mA] .mA]**

Out[*]= 55481

With the corrected vector a3:

In[6]:= **va1 = {4, 2, 2, 1}; va2 = {-1, 8, 4, 5}; va3c = {-7, 7, -8, 5}**

Out[6]= {-7, 7, -8, 5}

In[7]:= **vv1 = va1**

Out[7]= {4, 2, 2, 1}

In[8]:= **vv2 = va2 - $\frac{va2.vv1}{vv1.vv1} vv1$**

Out[8]= {-5, 6, 2, 4}

In[9]:= **vv3c = va3c - $\frac{va3c.vv1}{vv1.vv1} vv1 - \frac{va3c.vv2}{vv2.vv2} vv2$**

Out[9]= {2, 3, -8, 2}

In[10]:= **vv1.vv2**

Out[10]= 0

In[11]:= **vv1.vv3c**

Out[11]= 0

In[12]:= **vv2.vv3c**

Out[12]= 0

In[13]:= **Norm [vv1]**

Out[13]= 5

In[14]:= **Norm [vv2]**

Out[14]= 9

In[15]:= **Norm [vv3c]**

Out[15]= 9

In[16]:= **Norm [vv1] Norm [vv2] Norm [vv3c]**

Out[16]= 405

In[17]:= **Transpose [{va1, va2, va3c}] // MatrixForm**

Out[17]/MatrixForm=

$$\begin{pmatrix} 4 & -1 & -7 \\ 2 & 8 & 7 \\ 2 & 4 & -8 \\ 1 & 5 & 5 \end{pmatrix}$$

In[18]:= **mAc = Transpose[{va1, va2, va3c}]**

Out[18]= $\{\{4, -1, -7\}, \{2, 8, 7\}, \{2, 4, -8\}, \{1, 5, 5\}\}$

In[20]:= $\sqrt{\text{Det}[\text{Transpose}[\mathbf{mAc}] \cdot \mathbf{mAc}]}$

Out[20]= 405

To use the code on my website, I use

In[22]:= **TeXForm[mAc]**

Out[22]/TeXForm=

```
\left(
\begin{array}{ccc}
4 & -1 & -7 \\
2 & 8 & 7 \\
2 & 4 & -8 \\
1 & 5 & 5
\end{array}
\right)
```

And of course

In[21]:= **Norm[vv1] Norm[vv2] Norm[vv3c] == $\sqrt{\text{Det}[\text{Transpose}[\mathbf{mAc}] \cdot \mathbf{mAc}]}$**

Out[21]= True