#1 [[§ 12.2: p. 845: #32d]] Find the vector whose length and direction are given. Try to do the calculations w/out writing.

<table>
<thead>
<tr>
<th>Length</th>
<th>Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>$a &gt; 0$</td>
<td>$\frac{1}{\sqrt{2}} \hat{i} + \frac{1}{\sqrt{3}} \hat{j} - \frac{1}{\sqrt{6}} \hat{k}$</td>
</tr>
</tbody>
</table>

Solution: The length of the vector given above is 1 (I checked by "Inspection.")

The required vector is $\frac{a}{\sqrt{2}} \hat{i} + \frac{a}{\sqrt{3}} \hat{j} - \frac{a}{\sqrt{6}} \hat{k}$.

#2 [[§ 12.2: p. 845: #33]] Find a vector of magnitude 7 in the direction of $\vec{v} = 12\hat{i} - 5\hat{k}$.

Solution:

1. Find $\vec{u}$, the direction vector of $\vec{v}$.
   
   $\|\vec{v}\| = \sqrt{144 + 25} = \sqrt{169} = 13$
   
2. $\hat{u} = \frac{1}{\|\vec{v}\|} \vec{v} = \frac{12}{13} \hat{i} - \frac{5}{13} \hat{k}$ (This vector is the direction vector for $\vec{v}$.)

2. A vector of magnitude 7 in the direction of $\vec{v}$ is $7\vec{u} = \frac{84}{13} \hat{i} - \frac{35}{13} \hat{k}$. 