12.2 number 25: **Express $2\overrightarrow{\boldsymbol{i}} + \overrightarrow{\boldsymbol{j}} - 2\overrightarrow{\boldsymbol{k}}$ as a number times a unit vector.**

Answer:

The given vector has length $\sqrt{2^2 + 1^1 + (-2)^2} = 3$; so

$$\tfrac{1}{3}(2\overrightarrow{\boldsymbol{i}} + \overrightarrow{\boldsymbol{j}} - 2\overrightarrow{\boldsymbol{k}})$$

is a unit vector and

$$\boxed{2\overrightarrow{\boldsymbol{i}} + \overrightarrow{\boldsymbol{j}} - 2\overrightarrow{\boldsymbol{k}} = 3(\tfrac{1}{3}(2\overrightarrow{\boldsymbol{i}} + \overrightarrow{\boldsymbol{j}} - 2\overrightarrow{\boldsymbol{k}})).}$$