§ 13.4 QUESTION NUMBER 16

Solution

$$\mid \vec{v} \mid * \mid \vec{w} \mid \sin\theta = \mid\mid \vec{v} \times \vec{w} \mid\mid$$

$$= \mid\mid 2\,\vec{i} - 3\,\vec{j} + 5\,\vec{k} \mid\mid$$

$$= \sqrt{2^2 + (-3)^2 + 5^2}$$

$$= \sqrt{38}$$

$$\mid \vec{v} \mid * \mid \vec{w} \mid \cos\theta = \vec{v}.\vec{w}$$

$$= 3$$

then

$$\frac{\mid\mid \vec{v} \times \vec{w} \mid\mid}{\vec{v}.\vec{w}} =$$

$$\frac{\mid \vec{v} \mid * \mid \vec{w} \mid \sin\theta}{\mid \vec{v} \mid * \mid \vec{w} \mid \cos\theta}$$

$$= \tan\theta$$

$$= \frac{\sqrt{38}}{3}$$

$$\approx 2.05$$

Major Faults

A few student failed to recognize that there
was a sine and cosine in the cross and dot product
which could be exploited to obtain the tangent.

Some found it difficult to solve $\|2\vec{i} - 3\vec{j} + 5\vec{k}\|$.