24. If we wish to use Eq. 3-5 directly, we should note that the angles for $\vec{Q}$,$\vec{R}$ and $\vec{S}$ are 100°, 250° and 310°, respectively, if they are measured counterclockwise from the $+x$ axis.

(a) Using unit-vector notation, with the unit meter understood, we have

$$\begin{aligned}
\vec{P} &= 10\cos(25^\circ)\,\hat{\mathrm{i}} + 10\sin(25^\circ)\,\hat{\mathrm{j}} \\
\vec{Q} &= 12\cos(100^\circ)\,\hat{\mathrm{i}} + 12\sin(100^\circ)\,\hat{\mathrm{j}} \\
\vec{R} &= 8\cos(250^\circ)\,\hat{\mathrm{i}} + 8\sin(250^\circ)\,\hat{\mathrm{j}} \\
\vec{S} &= 9\cos(310^\circ)\,\hat{\mathrm{i}} + 9\sin(310^\circ)\,\hat{\mathrm{j}} \\
\vec{P}+\vec{Q}+\vec{R}+\vec{S} &= 10.0\,\hat{\mathrm{i}} + 1.6\,\hat{\mathrm{j}}
\end{aligned}$$

(b) The magnitude of the vector sum is $\sqrt{10^2 + 1.6^2} = 10.2$ m and its angle is $\tan^{-1}(1.6/10) \approx 9.2^\circ$ measured counterclockwise from the $+x$ axis. The appearance of this solution would be quite different using the vector manipulation capabilities of most modern graphical calculators, although the principle would be basically the same.