110. If $\mathbf{u}$ and $\mathbf{v}$ are both vectors in the *xy*-plane, then it is impossible to find their cross product.

111. $\mathbf{u}\cdot(\mathbf{v}\times\mathbf{w}) = \mathbf{v}\cdot(\mathbf{w}\times\mathbf{u})$

112. $\mathbf{u}\cdot(\mathbf{v}\times\mathbf{w}) = \mathbf{w}\cdot(\mathbf{v}\times\mathbf{u})$

113. If $\mathbf{u}$, $\mathbf{v}$, and $\mathbf{w}$ are coplanar, then $\mathbf{u}\cdot(\mathbf{v}\times\mathbf{w}) = 0$.

114. $\mathbf{u}\cdot[\mathbf{v}\times(\mathbf{w}+\mathbf{z})] = \mathbf{u}\cdot(\mathbf{v}\times\mathbf{w}) + \mathbf{u}\cdot(\mathbf{v}\times\mathbf{z})$

115. If $\mathbf{u}$ is orthogonal to both $\mathbf{v}$ and $\mathbf{w}$, then $\mathbf{u}$ is orthogonal to $\mathbf{v}\times\mathbf{w}$.

116. If $\mathbf{u}$ is orthogonal to both $\mathbf{v}$ and $\mathbf{w}$, then $\mathbf{u}$ is orthogonal to $\mathbf{v}\cdot\mathbf{w}$.

117. $(\mathbf{u}-\mathbf{v})\cdot(\mathbf{u}+\mathbf{v}) = |\mathbf{u}|^2 - |\mathbf{v}|^2$

118. If $\mathbf{v}$ is a vector in the plane with normal vector $\mathbf{n} = \langle n_1, n_2, n_3\rangle$, then $\mathbf{v}\cdot\mathbf{n} = 0$.

119. If $\mathbf{v}$ is a vector in the plane that has normal vector $\mathbf{n} = \langle n_1, n_2, n_3\rangle$, then $\mathbf{v}\times\mathbf{n}$ is another vector in the said plane.

Chapter 11
Technology Exercises

120. Write a program for a computer algebra system that finds a unit vector pointing in the direction of $a\,\mathbf{u} + b\,\mathbf{v}$ for given vectors $\mathbf{u}$, $\mathbf{v}$ and scalars a and b. Use it to find the unit vector pointing in the direction of $2\,\mathbf{u} - 3\,\mathbf{v}$ of Exercise 13.

121. Write a program for a computer algebra system that returns parametric equations for the line formed by the intersection of two given planes. (The program should accept the equations of the planes and return parametric equations for the line, displaying an appropriate message if the planes are parallel.) Use your program to check your answers for Exercises 75 and 76.

122. Write a short program for a computer algebra system that finds the distance between a point and a plane in three-dimensional space. Use it to revisit Exercises 1–6.

123. Write a program for your computer algebra system to determine the angle, in degrees, between two given three-dimensional vectors. Use it to check your answers for Exercises 27–28.

124–129. Use a graphing utility to check your answers for Exercises 88–93 by graphing the equations.