1. If $\vec{v}$ = ‹3, 6› and $\vec{u}$ = ‹2, 1›,

   A) Find the scalar projection of $\vec{u}$ onto $\vec{v}$.

   B) Find the vector projection of $\vec{u}$ onto $\vec{v}$.

   C) Find the orthogonal component of this vector projection.

   D) Find the scalar projection of $\vec{v}$ onto $\vec{u}$.

   E) Find the vector projection of $\vec{v}$ onto $\vec{u}$.

   F) Find the orthogonal component of this vector projection .

2. If $\vec{v}$ = ‹-2, 5› and $\vec{u}$ = ‹3, -4›,

   A) Find the scalar projection of $\vec{u}$ onto $\vec{v}$.

   B) Find the vector projection of $\vec{u}$ onto $\vec{v}$.

   C) Find the orthogonal component of this vector projection.

   D) Find the scalar projection of $\vec{v}$ onto $\vec{u}$.

   E) Find the vector projection of $\vec{v}$ onto $\vec{u}$.

   F) Find the orthogonal component of this vector projection .

3. If $|\vec{a}|$ = 24 at a 60° standard position angle, and $\vec{b}$ = $5\vec{i}$ + $2\vec{j}$, write the vector projection of $\vec{a}$ onto $\vec{b}$.

4. If $\vec{v}$ = <0, 5> and $\vec{u}$ = <-8, 6>,

    A) Find the scalar projection of $\vec{u}$ onto $\vec{v}$.

    B) Find the vector projection of $\vec{u}$ onto $\vec{v}$.

    C) Find the orthogonal component of this vector projection.

    D) Find the scalar projection of $\vec{v}$ onto $\vec{u}$.

    E) Find the vector projection of $\vec{v}$ onto $\vec{u}$.

    F) Find the orthogonal component of this vector projection .

5. If $\vec{v}$ = <7, -4> and $\vec{u}$ = <-2, 1>,

    A) Find the scalar projection of $\vec{u}$ onto $\vec{v}$.

    B) Find the vector projection of $\vec{u}$ onto $\vec{v}$.

    C) Find the orthogonal component of this vector projection.

    D) Find the scalar projection of $\vec{v}$ onto $\vec{u}$.

    E) Find the vector projection of $\vec{v}$ onto $\vec{u}$.

    F) Find the orthogonal component of this vector projection.

6. If $|\vec{a}|$ = 30 at a 120° standard position angle, and $\vec{b}$ = 3$\vec{i}$ + 4$\vec{j}$, write the vector projection of $\vec{a}$ onto $\vec{b}$ and the orthogonal component of that projection.

If $\vec{v}$ = <3, 6> and $\vec{u}$ = <2, 1>,

A) Find the scalar projection of $\vec{u}$ onto $\vec{v}$. $\dfrac{4\sqrt{5}}{5}$

B) Find the vector projection of $\vec{u}$ onto $\vec{v}$. $\dfrac{4}{5}\vec{i} + \dfrac{8}{5}\vec{j}$

C) Find the orthogonal component of this vector projection. $\dfrac{6}{5}\vec{i} - \dfrac{3}{5}\vec{j}$

D) Find the scalar projection of $\vec{v}$ onto $\vec{u}$. $\dfrac{12\sqrt{5}}{5}$

E) Find the vector projection of $\vec{v}$ onto $\vec{u}$. $\dfrac{24}{5}\vec{i} + \dfrac{12}{5}\vec{j}$

F) Find the orthogonal component of this vector projection. $\dfrac{-9}{5}\vec{i} + \dfrac{18}{5}\vec{j}$

2. If $\vec{v}$ = <-2, 5> and $\vec{u}$ = <3, -4>,

A) Find the scalar projection of $\vec{u}$ onto $\vec{v}$. $\dfrac{-26}{\sqrt{29}}$

B) Find the vector projection of $\vec{u}$ onto $\vec{v}$. $\dfrac{52}{29}\vec{i} - \dfrac{130}{29}\vec{j}$

C) Find the orthogonal component of this vector projection. $\dfrac{35}{29}\vec{i} + \dfrac{14}{29}\vec{j}$

D) Find the scalar projection of $\vec{v}$ onto $\vec{u}$. $\dfrac{-26}{5}$

E) Find the vector projection of $\vec{v}$ onto $\vec{u}$. $\dfrac{-78}{25}\vec{i} + \dfrac{104}{25}\vec{j}$

F) Find the orthogonal component of this vector projection. $\dfrac{28}{25}\vec{i} + \dfrac{21}{25}\vec{j}$

3. If $|\vec{a}|$ = 24 at a 60° standard position angle, and $\vec{b}$ = 5$\vec{i}$ + 2$\vec{j}$, write the vector projection of $\vec{a}$ onto b. $\langle 17.51, 7.0048 \rangle$

4. If $\vec{v}$ = ‹0, 5› and $\vec{u}$ = ‹-8, 6›,

    A) Find the scalar projection of $\vec{u}$ onto $\vec{v}$.   6

    B) Find the vector projection of $\vec{u}$ onto $\vec{v}$. $\langle 0, 6 \rangle$

    C) Find the orthogonal component of this vector projection. $\langle -8, 0 \rangle$

    D) Find the scalar projection of $\vec{v}$ onto $\vec{u}$.   3

    E) Find the vector projection of $\vec{v}$ onto $\vec{u}$. $\langle -2.4, 1.8 \rangle$

    F) Find the orthogonal component of this vector projection. $\langle 2.4, 3.2 \rangle$

5. If $\vec{v}$ = ‹7, -4› and $\vec{u}$ = ‹-2, 1›,

    A) Find the scalar projection of $\vec{u}$ onto $\vec{v}$. $\dfrac{-18}{\sqrt{65}}$

    B) Find the vector projection of $\vec{u}$ onto $\vec{v}$. $\dfrac{-126}{65}\vec{i} + \dfrac{72}{65}\vec{j}$

    C) Find the orthogonal component of this vector projection. $\dfrac{-4}{65}\vec{i} - \dfrac{7}{65}\vec{j}$

    D) Find the scalar projection of $\vec{v}$ onto $\vec{u}$. $\dfrac{-18}{\sqrt{5}}$

    E) Find the vector projection of $\vec{v}$ onto $\vec{u}$. $\dfrac{36}{5}\vec{i} - \dfrac{18}{5}\vec{j}$

    F) Find the orthogonal component of this vector projection. $\dfrac{-1}{5}\vec{i} - \dfrac{2}{5}\vec{j}$

6. If $|\vec{a}|$ = 30 at a 120° standard position angle, and $\vec{b}$ = $3\vec{i} + 4\vec{j}$, write the vector projection of $\vec{a}$ onto $\vec{b}$ and the orthogonal component of that projection.
$\langle 7.071, 9.428 \rangle$ $\langle -22.071, 16.553 \rangle$