The Cross Product

1. Find the value of each determinant (Similar to p.370 #7-10)

$$\begin{vmatrix} 2 & 5 \\ 8 & 3 \end{vmatrix}$$

2. Find the value of each determinant (Similar to p.370 #11-14)

$$\begin{vmatrix} A & B & C \\ 7 & -1 & 2 \\ 3 & -4 & -5 \end{vmatrix}$$

3. Find (a) **v** x **w**, (b) **w** x **v**, (c) **w** x **w**, and (d) **v** x **v** (Similar to p.370 #15-22)

$$v = 3i - 4j + k$$
$$w = 2i - 3j + 5k$$

4. Find (a) **v** x **w**, (b) **w** x **v**, (c) **w** x **w**, and (d) **v** x **v** (Similar to p.370 #15-22)

$$v = i + j + k$$
$$w = 5i - 2k$$

5. Use the given vectors **u**, **v**, and **w** to find each expression.
u = 3**i** – **j** + 2**k**   **v** = 4**i** + **j** – 5**k**
w = **i** + **j** + **k**
(Similar to p.370 #23-40)

$$u \times v$$

6. Use the given vectors **u**, **v**, and **w** to find each expression.
u = 3**i** – **j** + 2**k**   **v** = 4**i** + **j** – 5**k**
w = **i** + **j** + **k**
(Similar to p.370 #23-40)

$$v \times v$$

7. Use the given vectors **u**, **v**, and **w** to find each expression.
u = 3**i** – **j** + 2**k**   **v** = 4**i** + **j** – 5**k**
w = **i** + **j** + **k**
(Similar to p.370 #23-40)

$$(-2v) \times u$$

8. Use the given vectors **u**, **v**, and **w** to find each expression.
u = 3**i** – **j** + 2**k**   **v** = 4**i** + **j** – 5**k**
w = **i** + **j** + **k**
(Similar to p.370 #23-40)

$$u \cdot (w \times v)$$

9. Use the given vectors **u**, **v**, and **w** to find each expression.
u = 3**i** – **j** + 2**k**   **v** = 4**i** + **j** – 5**k**
w = **i** + **j** + **k**
(Similar to p.370 #41-44)

vector orthogonal to both **u** and **v**
(Hint u x v is orthogonal to both)

10. Find the area of the parallelogram with one corner at P_1 and adjacent sides $\overrightarrow{P_1P_2}$ and $\overrightarrow{P_1P_3}$
(Similar to p.370 #45-48)

$$P_1 = (-1,0,3), \quad P_2 = (3,5,-4), \quad P_3 = (4,-1,3)$$

Hint: $\|u \times v\|$ is the area of the parallelogram where u and v are adjacent sides

11. Find the area of the parallelogram with vertices P_1, P_2, P_3, and P_4
(Similar to p.370 #49-52)

$$P_1 = (4,2,3), \quad P_2 = (4,3,4),$$
$$P_3 = (0,-3,-1), \quad P_4 = (0,-2,0)$$

Hint: $\|u \times v\|$ is the area of the parallelogram where u and v are adjacent sides