Problem Set 5

1. Find **a•b** if:
a = < 6, -2, 3 > and **b** = < 2, 5, -1>
a = 2**i** + **j** and **b**= **i** – **j** – **k**

2. Find the angle between vectors:
a = 4**i** – 3**j** + **k**
b = 2**i** – **k**.

3. Find the three angles in a triangle with vertices of:
P(2, 0), Q(0,3), R(3,4).

4. Find the acute angle between the lines:
2x – y = 3
3x + y = 7

5. Find the direction cosines and direction angles of the vector:
i – 2**j** – 3**k**

6. Find the scale and vector projections of **b** onto **a** for:
a = < 3, 6, -2>
b = < 1, 2, 3 >

7. Find the cross product of **a x b** and verify it is orthogonal to both **a** and **b**.
a = **i + 3**j **–** 2**k**
b = **-i + 5**k

8. Find a nonzero vector orthogonal to the plane through the points P, Q, and R, and then find the area of triangle PQR.
P(1, 0, 1)
Q(-2, 1, 3)
R(4, 2, 5)

9. Find the volume of the parallelepiped determined by the vectors **a**, **b**, and **c**:
a = < 1, 2, 3 >
b = < -1, 1, 2 >
c = < 2, 1, 4 >

10. Find the volume of the parallelepiped with adjacent edges PQ, PR, and PS:
P(-2, 1, 0)
Q(2, 3, 2)
R(1, 4, -1)
S(3, 6, 1)