## MEMORIAL UNIVERSITY OF NEWFOUNDLAND DEPARTMENT OF MATHEMATICS AND STATISTICS

## ASSIGNMENT 9 MATH 2050 sect. 3 DUE DEC 1

## For practice and extra credit only.

- 1. Use vectors addition to show that
  - (a) In a triangle ABC vector  $\vec{AB} = -\frac{1}{2}\vec{NM}$ , where M and N are midpoints of sides AC and BC respectively.
  - (b) In a regular hexagon ABCDEF,  $\vec{AB} + \vec{AC} + \vec{AD} + \vec{AE} + \vec{AF} = 3\vec{AD}$
  - (c) In a regular *n*-gon  $A_1 \cdots A_n$  with center O and even number of vertices the sum  $\sum_{k=1}^{n} O\vec{A}_k = 0$ . Is it true if the number of vertices is odd?
- 2. Find the intersection point of two lines with direction vectors (1,2) and (-1,3) respectively if it is known that the first line goes via point (0,0) and the second via point (1,1).
- 3. Write equation of line going via points (1,2,3) and (4,5,6). Does point A belong to the line? If not, what is the distance from the point to the line?
  - a) A(-1,0,1)
  - b) A(5,7,9)
- 4. Find the projection of vector  $\vec{v} = (2, 5, 7)$  onto vector  $\vec{u} = (-2, 1, 3)$ .
- 5. Consider parallelogram with vertices at

$$(1, 1, 1), (3, 6, 8), (-1, 2, 4), (1, 7, 11)$$

- (a) find the area of the parallelogram
- (b) find equation of the plane to which the parallelogram belongs.
- 6. Give an example of two lines which intersect at point (1,2,3) at the right angle. Justify.
- 7. Give an example of a plane which is orthogonal to the vector (2,3,4). Explain.