MATH 1350 Exam I 22 September 2014
Make up

Answer the problems on separate paper. You do not need to rewrite the problem statements on your answer sheets. Work carefully. Do your own work. **Show all relevant supporting steps!**

1. (12 pts) For the two given points A, B determine:

   a. the length of the line segment from A to B
   b. the mid-point of the line segment from A to B
   c. the slope of the line segment from A to B

   $A = (-3, 5),\ B = (-2, 3)$

2. (12 pts) Using the distance formula, determine whether the three given points A, B, C are the vertices of a right triangle:

   $A = (2, 3),\ B = (3, -2),\ C = (-3, 2)$

3. (12 pts) Using the mid-point formula, determine whether the four given points A, B, C, D are the vertices of a parallelogram, i.e., determine whether the diagonals AC and BD of the quadralateral ABCD bisect each other, i.e., determine whether the diagonals AC and BD of the quadralateral ABCD have the same common midpoint:

   $A = (-2, -11),\ B = (6, 8),\ C = (-6, 17),\ D = (-14, -2)$

4. (12 pts) Using the slope formula, determine whether three given points A, B, C are the vertices of a right triangle:

   $A = (-2, 3),\ B = (2, 2),\ C = (-4, -4)$

5. (16 pts) Sketch the graphs of the following pair of equations and find the points (if any) of intersection:

   $3x - 4y = 6$
   $-2x + 8y = -8$

6. (12 pts) Let $\mathbf{u} = -4\mathbf{i} + 3\mathbf{j}$, $\mathbf{v} = 2\mathbf{i} - 5\mathbf{j}$, $\mathbf{w} = -2\mathbf{i} + 4\mathbf{j}$. Find

a. $2\mathbf{u} + 3\mathbf{v}$,

b. $3\mathbf{u} + 4\mathbf{v} - 2\mathbf{w}$

c. A unit vector in the direction of $\mathbf{v}$

d. $\mathbf{w} \bullet (\mathbf{u} - \mathbf{v})$

7. (12 pts) Using the dot product, determine whether the three given points A, B, C are the vertices of a right triangle:

$A = (3, 2),\ B = (-2, 4),\ C = (1, -3)$

8. (12 pts) Find the vector projection of $\mathbf{u}$ onto $\mathbf{v}$ where

$\mathbf{u} = 3\mathbf{i} + 5\mathbf{j};\ \mathbf{v} = -\mathbf{i} + 3\mathbf{j}$