

Math 210 (Lesieutre)  
11.1: Vectors in the plane  
January 9, 2017

**Problem 1.** Let  $\mathbf{u} = \langle 1, 3 \rangle$  and  $\mathbf{v} = \langle 0, -2 \rangle$ .

a) Compute  $\mathbf{u} + 2\mathbf{v}$ , both geometrically and algebraically. Do your answers match?

b) Compute  $\mathbf{u} - \mathbf{v}$ , both geometrically and algebraically.

c) Compute  $3\mathbf{u}$ , both geometrically and algebraically.

d) What is the magnitude of  $\mathbf{v}$  (i.e.  $|\mathbf{v}|$ )? Does the formula match the picture?

**Problem 2.** a) What is the vector pointing from  $(1, 1)$  to  $(4, -3)$ ?

b) Find a unit vector parallel to the vector in your answer from (a).

c) Find a vector with length 7 parallel to the vector in your answer from (a).

**Problem 3.** Relative to the air, an airplane is flying 30 degrees west of north, with speed 500 MPH. The wind is traveling due north at 100 MPH. What is the velocity vector of the airplane relative to the ground?

**Problem 4.** A 10-pound weight is suspended from two strings, each making a 45 degree angle with the ceiling. How much force is exerted on the mass by each of the strings?