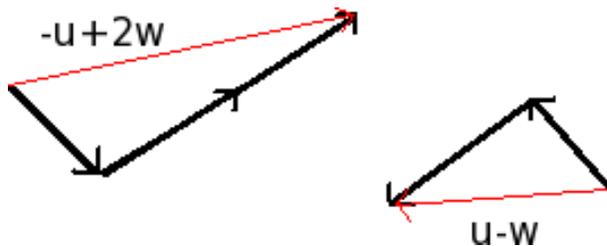


### Solutions to Quiz 1 - September 31, 2011

1. Given the vectors below, draw the vectors  $-\mathbf{u} + 2\mathbf{w}$  and  $\mathbf{u} - \mathbf{w}$ .



**SOLUTION:**



2. Give the equation for the plane containing the point  $P = (-3, 1, 0)$  and having normal vector  $\mathbf{n} = (1, 4, 3)$ .

**SOLUTION:**

$$(x + 3) + 4(y - 1) + 3z = 0$$

or

$$x + 4y + 3z = 1$$

3. (a) Find a unit vector in the direction of  $\mathbf{v} = (2, -1, 2)$ .

**SOLUTION:**  $(2/3, -1/3, 2/3)$ .

- (b) Find the projection  $\text{proj}_{\mathbf{v}}(\mathbf{u})$  of the vector  $\mathbf{u} = (1, 7, 2)$  onto  $\mathbf{v}$ .

**SOLUTION:**

$$\left( \frac{\mathbf{u} \cdot \mathbf{v}}{\|\mathbf{v}\|^2} \right) \mathbf{v} = \frac{-1}{9} (2, -1, 2) = (-2/9, 1/9, -2/9)$$