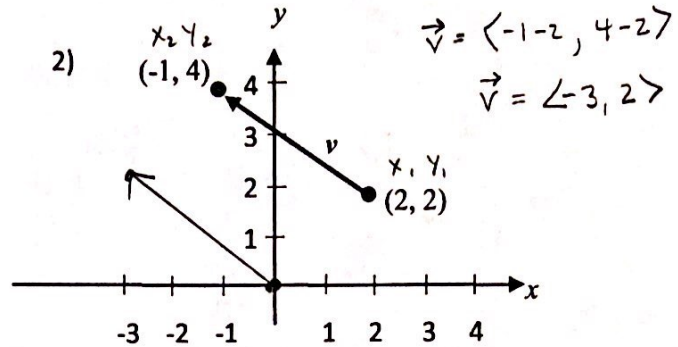
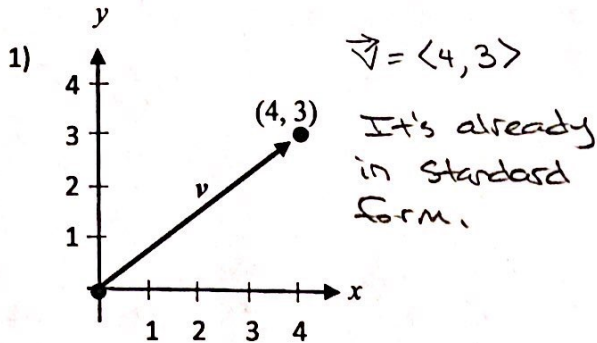


## Component Form of a Vector

For each of the following ..... (a) find the component form of the vector  $\langle x, y \rangle$   
 (b) sketch the vector in standard position

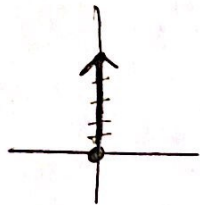
Initial Pt.  $\rightarrow$  terminal Pt.  
 tail  $(x_1, y_1)$  Head  $(x_2, y_2)$



3) initial point:  $(3, -2)$   
 terminal point:  $(3, 3)$

$$\vec{v} = \langle 3-3, 3-(-2) \rangle$$

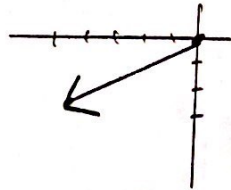
$$\vec{v} = \langle 0, 5 \rangle$$



4) initial point:  $(\frac{5}{2}, 1) = (\frac{5}{2}, 1)$   
 terminal point:  $(-2, -\frac{3}{2}) = (-2, -\frac{3}{2})$

$$\vec{v} = \langle -\frac{4}{2} - \frac{5}{2}, -\frac{3}{2} - \frac{2}{2} \rangle$$

$$\vec{v} = \langle -\frac{9}{2}, -\frac{5}{2} \rangle$$

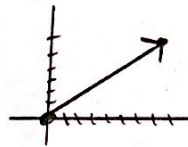


5) tail:  $(-3, -5)$

head:  $(5, 1)$

$$\vec{v} = \langle 5-(-3), 1-(-5) \rangle$$

$$\vec{v} = \langle 8, 6 \rangle$$

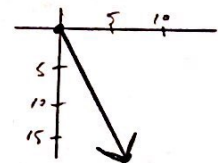


6) tail:  $(-4.2, 5)$

head:  $(3.7, -12.9)$

$$\vec{v} = \langle 3.7-(-4.2), -12.9-5 \rangle$$

$$\vec{v} = \langle 7.9, -17.9 \rangle$$



## Vector Operations

For each of the following, find: (a)  $\mathbf{u} + \mathbf{v}$

(b)  $\mathbf{u} - \mathbf{v}$

(c)  $2\mathbf{u} - 3\mathbf{v}$

(d)  $\mathbf{v} + 4\mathbf{u}$

7)  $\mathbf{u} = \langle 4, 2 \rangle$  and  $\mathbf{v} = \langle 7, 1 \rangle$

a)  $\langle 4, 2 \rangle + \langle 7, 1 \rangle = \langle 11, 3 \rangle$

b)  $\langle 4, 2 \rangle - \langle 7, 1 \rangle = \langle -3, 1 \rangle$

c)  $2\langle 4, 2 \rangle - 3\langle 7, 1 \rangle = \langle 8, 4 \rangle + \langle -21, -3 \rangle$   
 $= \langle -13, 1 \rangle$

d)  $\langle 7, 1 \rangle + 4\langle 4, 2 \rangle = \langle 7, 1 \rangle + \langle 16, 8 \rangle$   
 $= \langle 23, 9 \rangle$

8)  $\mathbf{u} = \langle -5, -2 \rangle$  and  $\mathbf{v} = \langle -4, 0 \rangle$

a)  $\langle -5, -2 \rangle + \langle -4, 0 \rangle = \langle -9, -2 \rangle$

b)  $\langle -5, -2 \rangle - \langle -4, 0 \rangle = \langle -1, -2 \rangle$

c)  $2\langle -5, -2 \rangle - 3\langle -4, 0 \rangle$   
 $= \langle -10, -4 \rangle + \langle 12, 0 \rangle = \langle 2, -4 \rangle$

d)  $\langle -4, 0 \rangle + 4\langle -5, -2 \rangle$   
 $= \langle -4, 0 \rangle + \langle -20, -8 \rangle = \langle -24, -8 \rangle$