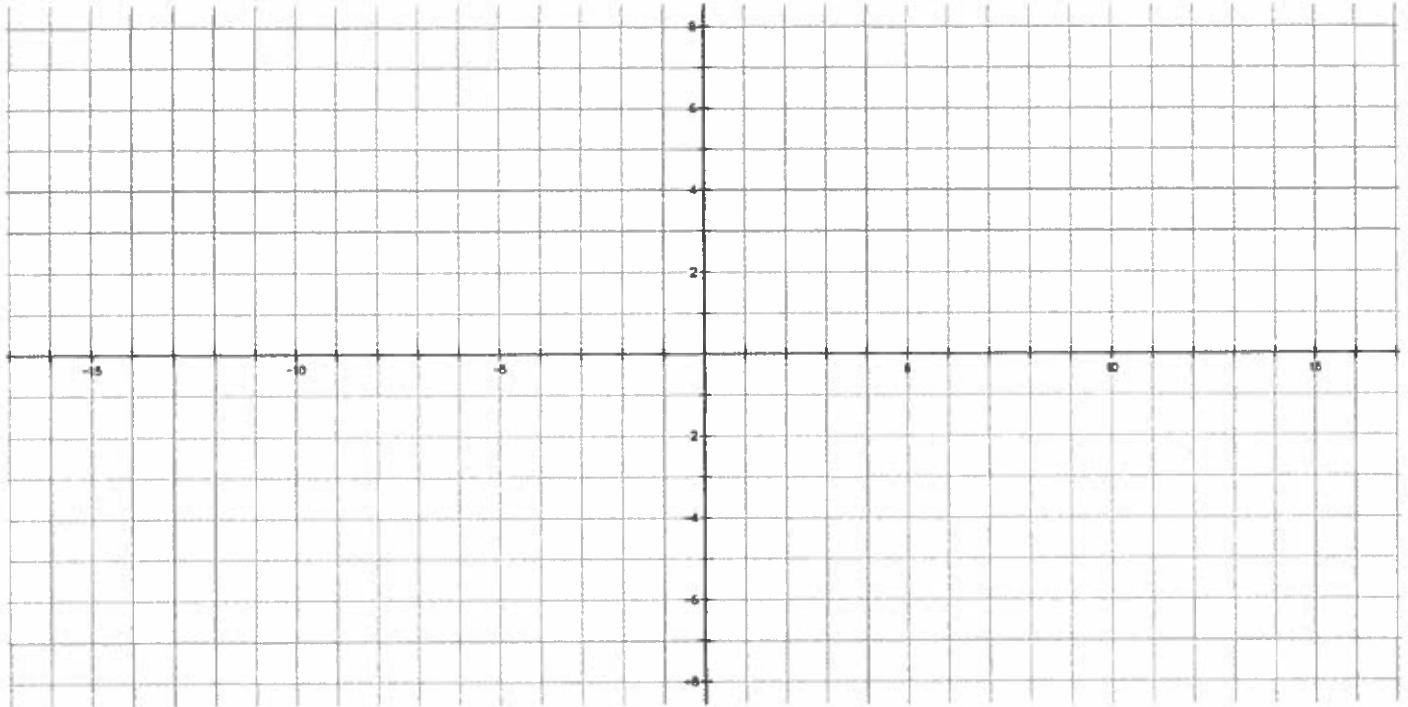


1. Sketch and label following vectors. Assume a standard coordinate system.

$$\vec{a} = [2,0], \vec{b} = [-4,0], \vec{c} = [0,-5], \vec{d} = [0,7], \vec{e} = [3,3], \vec{f} = [2,-6], \vec{g} = [-5,-1]$$



2. a) Sketch a velocity vector  $\vec{v} = 10 \text{ m/s [S } 30^\circ \text{ W]}$ .

b) Find the horizontal vector component of  $\vec{v}$

c) Find the vertical vector component of  $\vec{v}$

d) Write the velocity vector in vector notation.

5. An object is thrown with initial velocity of 23 m/s at angle of  $57^\circ$  above horizontal.

a) Sketch the initial velocity vector. Label the angle and both vector components.

b) Calculate the horizontal component.

c) Calculate the vertical component.

d) Express the initial velocity in vector notation.

6. a) If an object was thrown with initial velocity  $\vec{v} = [-5, 2] \text{ m/s}$  what do you know about the object's initial speed?

b) Was the object thrown above or below the horizontal? At what angle?

3. a) Sketch a displacement vector  $\vec{d} = 47 \text{ m}$  [25° E of N].

b) Find the horizontal vector component of  $\vec{d}$

c) Find the vertical vector component of  $\vec{d}$

d) Write the displacement vector in vector notation.

4. a) Sketch the displacement vector  $\vec{d} = [5,2]m$ .

b) Find the magnitude of this displacement vector. (Pythagorean Theorem)

c) Find the direction of this displacement.

7. What are the assumptions you make when you consider an object to be experiencing a free-fall?

8. Is the acceleration due to gravity dependent on the mass of the object? **Why or why not?**

9. An object was thrown with initial velocity of 12 m/s  $15^\circ$  below horizontal.

a) Sketch the vector and label your diagram.

b) Find the vector components of the object's initial velocity.

c) Express the initial velocity in vector notation.