

## Two Dimensional Motion Introduction

During a previous class we derived the equation  $d = v_0t + \frac{1}{2}at^2$ . Recall that  $d$  is displacement,  $v_0$  is the velocity at time zero and  $a$  is the acceleration. Use this and what you learned previously to answer the following questions.

- 1) Which of the quantities in the equation above are vectors? Which are scalars?
- 2) What does multiplying a scalar times a vector do to the vector?
- 3) Rewrite the equation notating the quantities that have a direction with an arrow above the quantity.

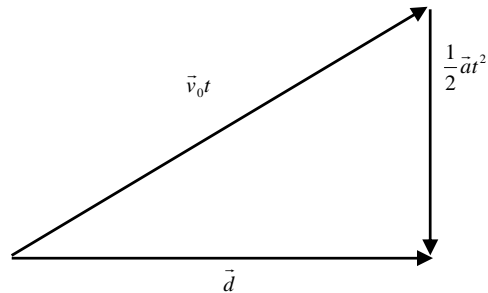
You should see that the equation, with the appropriate vectors labeled, should be written:

$$\vec{d} = \vec{v}_0 t + \frac{1}{2} \vec{a} t^2$$

4) What are the units of each element (i.e.  $d$ ,  $v_0 t$ , etc) of the above equation?

5) Using the units: how many displacements vectors are in this equation?

**Study the drawing below and answer the questions that follow.**



6) Is this vector triangle consistent with the equation given above? Explain using the rules you developed for adding vectors.

7) On the vector triangle, circle the initial and final positions. Within the triangle, draw the actual path of the object's motion.

8) If we were to stop the motion midway, what would the vector triangle look like?