

# PhyzJob: Algebraic Kinematics Primer



1. List the equations for uniform accelerated motion.

"WHO CARES" QUANTITY	EQUATION
$v$	
$v_0$	
$t$	
$x$	
$a$	

2. Write the correct equation (from the selections above) to use in solving the type of problem listed in each case below. Do **not** rearrange the equation to actually *solve* the problem, merely write down the equation you would start with.

a. Given  $v_0$ ,  $v$ , and  $a$ .  
Find  $t$ .

Eqn: \_\_\_\_\_

b. Given  $x$ ,  $a$ , and  $t$ .  
Find  $v_0$ .

Eqn: \_\_\_\_\_

c. Given  $x$ ,  $v$ , and  $t$ .  
Find  $v_0$ .

Eqn: \_\_\_\_\_

d. Given  $a$ ,  $t$ , and  $v$ .  
Find  $v_0$ .

Eqn: \_\_\_\_\_

e. Given  $v_0$ ,  $v$ , and  $a$ .  
Find  $x$ .

Eqn: \_\_\_\_\_

f. Given  $v_0$ ,  $x$ , and  $a$ .  
Find  $t$ .

Eqn: \_\_\_\_\_

g. Given  $t$ ,  $a$ , and  $x$ .  
Find  $v$ .

Eqn: \_\_\_\_\_

h. Given  $v_0$ ,  $a$ , and  $x$ .  
Find  $v$ .

Eqn: \_\_\_\_\_

i. Given  $v_0$ ,  $v$ , and  $x$ .  
Find  $a$ .

Eqn: \_\_\_\_\_

j. Given  $v_0$ ,  $a$ , and  $t$ .  
Find  $x$ .

Eqn: \_\_\_\_\_

k. Given  $v_0$ ,  $t$ , and  $v$ .  
Find  $a$ .

Eqn: \_\_\_\_\_

l. Given  $v_0$ ,  $t$ , and  $v$ .  
Find  $x$ .

Eqn: \_\_\_\_\_

3. Now, for the first four cases from part 2, continue the solving process by rearranging the initial equation to solve for the desired quantity. Draw a box around the final rearrangement.

Ex. Given  $v_0$ ,  $t$ , and  $v$ .  
Find  $a$ .

initial eqn:  $v = v_0 + at$

$$v - v_0 = at$$

$$a = (v - v_0)/t$$

a. Given  $v_0$ ,  $v$ , and  $a$ .  
Find  $t$ .

initial eqn:

b. Given  $x$ ,  $a$ , and  $t$ .  
Find  $v_0$ .

initial eqn:

c. Given  $x$ ,  $v$ , and  $t$ .  
Find  $v_0$ .

initial eqn:

d. Given  $a$ ,  $t$ , and  $v$ .  
Find  $v_0$ .

initial eqn:

4. Solve the following problem below completely, **then** check your answer against the one printed to the right.

An automobile accelerates at  $4 \text{ m/s}^2$  from  $20 \text{ m/s}$  to  $36 \text{ m/s}$ .  
How long did that acceleration take?

$$\begin{aligned}
 & \boxed{t = 2} \\
 & t = (36 \text{ m/s} - 20 \text{ m/s}) / 4 \text{ m/s}^2 \\
 & t = (16 \text{ m/s}) / 4 \\
 & t = 4 \text{ s} \\
 & v = 36 \text{ m/s} \\
 & v_0 = 20 \text{ m/s}
 \end{aligned}$$

ANSWER: Don't beek until you've solved the problem.