PHYS 1110 Group Work Sheet 4
Constant acceleration; vectors

1. Four formulas are useful for describing constant-acceleration motion.

$$v = v_0 + at \quad (1)$$

$$x - x_0 = v_0 t + 1/2\, at^2 \quad (2)$$

$$v^2 - v_0^2 = 2a(x - x_0) \quad (3)$$

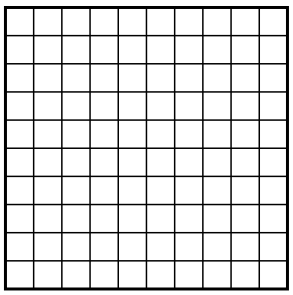
$$x - x_0 = 1/2\,(v_0 + v)t \quad (4)$$

For the scenarios described below, tell the values of the quantities provided, write a question mark ("?") for the desired quantity, and identify the number of the formula that fits the situation. Assume constant acceleration in all scenarios.

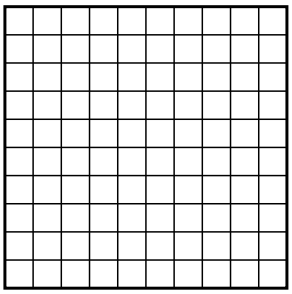
Scenario	a	v_0	v	$x - x_0$	t	Eq
A car initially traveling at 18.0 m/s stops in 6.0 s. What is its acceleration?						
A car initially traveling at 18.0 m/s brakes at –1.5 m/s^2. How much time does it take to reach a speed of 6.0 m/s?						
A car initially traveling at 18.0 m/s brakes at –1.5 m/s^2. How far does it travel until it reaches a speed of 6.0 m/s?						
A car initially traveling at 18.0 m/s stops in 9.0 s. How far does it travel before stopping?						
A car initially traveling at 18.0 m/s brakes at –1.5 m/s^2. How much time does it take to travel 30.0 m?						
A car initially traveling at 18.0 m/s stops in 72.0 m. What was its acceleration?						
A bullet travels 0.58 m down a rifle barrel, reaching a speed of 400 m/s. How much time did it take?						
A cyclist initially traveling at 4.0 m/s accelerates downhill at 0.50 m/s^2 for 124 m. What was the cyclist's final speed?						
A cyclist initially traveling at 4.0 m/s accelerates downhill for 15.5 s, traveling 124 m. What was the cyclist's acceleration?						

Vector $\vec{A}$ can be expressed in (x, y) components as $\vec{A}$ = (2.00 m/s, 5.00 m/s). Vector $\vec{B}$ = (1.00 m/s, –3.00 m/s).

2. Draw vectors $\vec{A}$ and $\vec{B}$ in the grid.



3. Graphically add $\vec{A} + \vec{B}$ in the grid.



4. Find $\vec{A} + \vec{B}$ by adding the components together.