Name: _____ Date: _____

PHYSICS
Acceleration & Velocity Calculations

Velocity	Acceleration	Acceleration	a = acceleration (m/s^2) v = speed (m/s) $\vec{v}$ = velocity (m/s) t = time (s) d = distance (m) Δx = "how far" or displacement (m) f = final 0 = initial
$\vec{v} = \frac{\Delta x}{t}$ **Final velocity**	$a = \frac{\vec{v}_f - \vec{v}_0}{t}$	$a = \frac{2 \cdot (\Delta x - \vec{v}_0 \cdot t)}{t^2}$	
Final velocity	How Far		
$\vec{v}_f = \vec{v}_0 + a \cdot t$	$\Delta x = \vec{v}_0 \cdot t + \frac{1}{2} a \cdot t^2$		

Instructions

- Read each question carefully.
- Identify the numbers, match them to the correct variables.
- Convert time to seconds. 1 min = 60 s; 1 hr = 3600 s. If time is already in units of seconds, no conversion is needed.
- Convert distance to meters. 1 km = 1000 m. If distance is already in units of meters, no conversion is needed.
- Choose the correct equation to solve for the variable in the question.
- Type your answer into the answer box.

Part 1. Calculate Acceleration. Complete the table and solve for acceleration.

Problem	Initial velocity $\vec{v}_o$ (m/s)	Final velocity $\vec{v}_f$ (m/s)	Time t (s)	Acceleration a (m/s^2)
1. Henry rode his bicycle. He was moving at 2.5 m/s. He sped up to 10.0 m/s in 5.0 s. Calculate the acceleration.				
2. Darius was driving his car. The car was moving at 30 m/s, then suddenly slowed to 10 m/s in 8.0 s. Calculate the acceleration.				
3. Bob rode his skateboard down a hill for 5.6 seconds. His velocity increased from 2.0 m/s to 12.0 m/s. Calculate the acceleration.				

Part 2. Calculate Acceleration. Complete the table and solve for acceleration.

Problem	Initial velocity $\vec{v}_o$ (m)	How far Δx (m)	Time t (s)	Acceleration a (m/s^2)
4. Henry rode his bicycle. He was moving at 2.5 m/s. He sped up for 6.0 seconds over 44.0 m. Calculate the acceleration.				
5. Darius was driving his car. The car was motionless, then got faster in 8.0 seconds over 120 m. Calculate the acceleration.				
6. Bob rode his skateboard at 3.0 m/s. He then skated down a hill for 6.4 s. The length of the hill's slope was 36 m. Calculate the acceleration.				

Part 3. Calculate How Far. Complete the table and solve for "How Far".

Problem	Initial velocity $\vec{v}_o$ (m)	Acceleration a (m/s^2)	Time t (s)	How far Δx (m)
7. Henry rode his bicycle. He was moving at 2.5 m/s. He accelerated for 7.2 s at 0.84 m/s^2. Calculate how far he moved as he got faster.				
8. Darius was driving his car. The car was motionless, then got faster in 8.0 seconds at 7.33 m/s^2. Calculate how far the car moved as it got faster.				
9. Bob rode his skateboard at 14.0 m/s. He slowed for 2.2 s with at -4.90 m/s^2. Calculate how far Bob moved as he got slower.				

Part 4. Calculate Acceleration. Complete the table and solve for final velocity.

Problem	Initial velocity $\vec{v}_o$ (m/s)	Acceleration a (m/s^2)	Time t (s)	Final velocity $\vec{v}_f$ (m/s)
10. Henry rode his bicycle. He was moving at 2.5 m/s. He accelerated for 7.2 s at 0.84 m/s^2. Calculate his final velocity after he sped up.				
11. Darius was driving his car. The car was motionless, then got faster in 8.0 seconds at 7.33 m/s^2. Calculate his final velocity after the car sped up.				
12. Bob rode his skateboard at 14.0 m/s. He slowed for 2.2 s with at -4.90 m/s^2. Calculate Bob's final velocity after he slowed.				