## AP Physics - Vectors Go On and On -8



Vital papers will demonstrate their vitality by spontaneously moving from where you left them to where you can't find them. -- Anonymous

1. A ball is at rest on a ramp as shown. If the ramp makes an angle of $11.0^{\circ}$ to the horizontal, what is the acceleration component down the ramp? If the ball rolls down the ramp a distance of 1.2 m , how much time did it take? As you can see, $\boldsymbol{g}$ is the resultant of the acceleration down the ramp and perpendicular to the ramp.

2. A kid runs straight off a diving board. The diving board is 3.0 m above the water. If the kid travels 2.5 m horizontally from the edge of the board when he hits the water, what was his horizontal speed?
3. The nose wheel falls off of a 767 when it is flying at an altitude of 12500 m . (a) How much time for it to hit the ground? (b) If the plane has an air speed of $885 \mathrm{~km} / \mathrm{h}$, what is the horizontal distance that the wheel travels before it hits the ground.
4. A 5 inch projectile is fired with a velocity of $288.7 \mathrm{~m} / \mathrm{s}$ at an angle of $18.0^{\circ}$ to the horizontal. How far does the projectile travel?
5. An aircraft launches a bomb. The plane is flying upward at an angle of $55.0^{\circ}$ to the horizon. When the bomb is launched, the plane has a speed of $745 \mathrm{~km} / \mathrm{h}$. At the time of launch, the bomb is 8750 m above the ground. So (a) how high does the bomb go from where it was launched? (b) How much time till it hits? (c) How far horizontally does it travel?
