PHY 166, Fall 2021, TEST 1 Practice
(3 points maximum for each problem, 15 points maximum for the whole)

1. An object moves from the position $\mathbf{r}_{1}=(1,3,-5)$ to the position $\mathbf{r}_{2}=(-1,4,8)$ during the time 8 s . Find: (a) displacement; (b) distance; (c) average velocity; (d) average speed.
2. A car is traveling a road that makes quarter of a circle with a constant speed $s$. What is the magnitude of the average velocity $v$ of the car?
3. Two stones are thrown vertically up with the initial velocity $v_{0}$, second stone with a time delay $t_{0}$ with respect to the first one. At which time after the beginning of the motion the two stones will collide? Is this scenario possible for any $v_{0}$ and $t_{0}$ ? What are the limitations?
4. A gunman shoots from a riffle in a horizontal direction without correcting for gravity. How much below the intended target, at a horizontal distance $d$, will the bullet strike if its initial speed is $v_{0}$ ?
5. A ship crosses a river aiming at the angle $\theta$ to the left from the straight course. The speed of the ship with respect to water is $v^{\prime}$. The width of the river is $d$ and the water velocity is $u$ to the right. What will be the side displacement $h$ of the ship as it lands on the other shore?
