1.(1 pt) Given that the acceleration vector is $\mathbf{a}(t) = (-4\cos(-2t))\,\mathbf{i} + (-4\sin(-2t))\,\mathbf{j} + (4t)\,\mathbf{k}$, the initial velocity is $\mathbf{v}(0) = \mathbf{i} + \mathbf{k}$, and the initial position vector is $\mathbf{r}(0) = \mathbf{i} + \mathbf{j} + \mathbf{k}$, compute:

A. The velocity vector $\mathbf{v}(t) =$ ____ **i**+ ____ **j**+ ____ **k**

B. The position vector $\mathbf{r}(t) =$ ____ **i**+ ____ **j**+ ____ **k**

Note: the coefficients in your answers must be entered in the form of expressions in the variable *t*; e.g. "5 cos(2t)"

2.(1 pt) A gun has a muzzle speed of 80 meters per second. What angle of elevation should be used to hit an object 150 meters away? Neglect air resistance and use $g = 9.8 m/sec^2$ as the acceleration of gravity.

_____ radians

3.(1 pt) Match the parametric equations with the verbal descriptions of the surfaces by putting the letter of the verbal description to the left of the letter of the parametric equation.

__ 1. $\mathbf{r}(u,v) = u\mathbf{i} + v\mathbf{j} + (2u - 3v)\,\mathbf{k}$
__ 2. $\mathbf{r}(u,v) = u\cos v\,\mathbf{i} + u\sin v\,\mathbf{j} + u^2\mathbf{k}$
__ 3. $\mathbf{r}(u,v) = u\mathbf{i} + \cos v\,\mathbf{j} + \sin v\,\mathbf{k}$
__ 4. $\mathbf{r}(u,v) = u\mathbf{i} + u\cos v\,\mathbf{j} + u\sin v\,\mathbf{k}$

A. circular paraboloid
B. cone
C. plane
D. circular cylinder

4.(1 pt) A factory has a machine which bends wire at a rate of 7 unit(s) of curvature per second. How long does it take to bend a straight wire into a circle of radius 10?

_____ seconds