POSITION, VELOCITY, AND ACCELERATION

Find the position and velocity functions having the given acceleration and initial position and velocity at time $t = 0$ *seconds*. Then find the speed at time $t = 5$ *seconds*. Assume that the units associated with distance are *feet*.

1. $\vec{a}(t) = -32\hat{k},\ \vec{v}(0) = \vec{0},\ \vec{r}(0) = 100\hat{k}$

2. $\vec{a}(t) = -32\hat{k},\ \vec{v}(0) = -3\hat{k},\ \vec{r}(0) = 100\hat{k}$

3. $\vec{a}(t) = -32\hat{k},\ \vec{v}(0) = 10\hat{i} + 10\hat{j} + 10\hat{k},\ \vec{r}(0) = \vec{0}$

4. $\vec{a}(t) = -\cos(t)\hat{i} - \sin(t)\hat{j},\ \vec{v}(0) = -\hat{i},\ \vec{r}(0) = \hat{j}$

5. $\vec{a}(t) = -5\cos(t)\hat{i} - 5\sin(t)\hat{j},\ \vec{v}(0) = -5\hat{i} + 5\hat{j},\ \vec{r}(0) = 5\hat{i} + 5\hat{j}$