Vector Functions and Curves
One variable functions

Question
Find the velocity, speed and acceleration of the particle with position given by $\underline{r}(t)$ at time t. Also determine the particles path.

$$\underline{r} = a\cos\omega t\underline{i} + b\underline{j} + a\sin\omega t\underline{k}$$

Answer
Position: $\underline{r} = a\cos\omega t\underline{i} + b\underline{j} + a\sin\omega t\underline{k}$
Velocity: $\underline{v} = -a\omega\sin\omega t\underline{i} + a\omega\cos\omega t\underline{k}$
Speed: $v = |a\omega|$
Acceleration: $\underline{a} = -a\omega^2\cos\omega t\underline{i} - a\omega^2\sin\omega t\underline{k}$
Path: the circle $x^2 + z^2 = a^2$, $y = b$.