69. (a) With length in centimeters and time in seconds, we have

$$u = \frac{dy}{dt} = -60\pi \cos\Big(\frac{\pi x}{8} - 4\pi t\Big) \quad .$$

Thus, when $x = 6$ and $t = \frac{1}{4}$, we obtain

$$u = -60\pi \cos\frac{-\pi}{4} = \frac{-60\pi}{\sqrt{2}} = -133$$

so that the *speed* there is 1.33 m/s.

(b) The numerical coefficient of the cosine in the expression for $u$ is $-60\pi$. Thus, the maximum *speed* is 1.88 m/s.

(c) Taking another derivative,

$$a = \frac{du}{dt} = -240\pi^2 \sin\Big(\frac{\pi x}{8} - 4\pi t\Big)$$

so that when $x = 6$ and $t = \frac{1}{4}$ we obtain $a = -240\pi^2 \sin\frac{-\pi}{4}$ which yields $a = 16.7$ m/s$^2$.

(d) The numerical coefficient of the sine in the expression for $a$ is $-240\pi^2$. Thus, the maximum acceleration is 23.7 m/s$^2$.