10. *Slide Problem:* Phoebe sits atop the swimming pool slide (Figure 1-3l). At time $t = 0$ s she pushes off. Calvin finds that her velocity, $v(t)$, in ft/s, is given by

$$v(t) = 10 \sin 0.3t$$

Figure 1-3l

Phoebe splashes into the water at time $t = 4$ s.

a. Plot the graph of function v. Use radian mode.

b. How fast was Phoebe going when she hit the water? What, then, are the domain and range of the velocity function?

c. Find, approximately, the definite integral of the velocity function from $t = 0$ to $t = 4$. What are the units of the integral? What real-world quantity does this integral give you?

d. What, approximately, was the derivative of the velocity function when $t = 3$? What are the units of the derivative? What is the physical meaning of the derivative in this case?

11. *Negative Velocity Problem:* Velocity differs from speed in that it can be *negative*. If the velocity of a moving object is negative, then its distance from its starting point is *decreasing* as time increases. The graph in Figure 1-3m shows $v(t)$, in cm/s, as a function of t, in seconds, after its motion started. How far is the object from its starting point when $t = 9$?

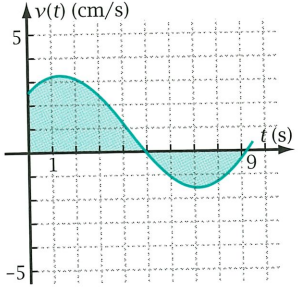

Figure 1-3m

12. Write the meaning of derivative.

13. Write the meaning of definite integral.

14. Write the verbal definition of limit.