



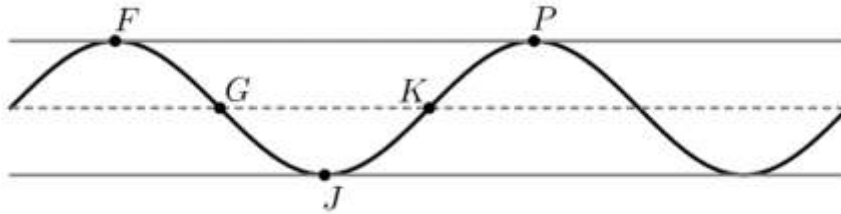
**Note: Figure NOT drawn to scale**

1. Steve and his friend are playing together on a seesaw as shown in the figure above. At time  $t = 0$  seconds, the distance between the top of Steve's head and the ground is 24 inches. At his highest point, Steve's head is 60 inches above the ground. Steve goes all the way up and back down on the seesaw every 3 seconds. As the two friends play on the seesaw, the distance between the top of Steve's head and the ground periodically increases and decreases.

The periodic function  $d$  models the distance, in inches, between the top of Steve's head and the ground as a function of time  $t$  in seconds.

(A) The graph of  $d$  and its dashed midline for two full cycles is shown. Five points,  $F$ ,  $G$ ,  $J$ ,  $K$ , and  $P$  are labeled on the graph. No scale is indicated, and no axes are presented.

Determine possible coordinates  $(t, d(t))$  for the five points:  $F$ ,  $G$ ,  $J$ ,  $K$ , and  $P$ .



(B) Refer to the graph of  $d$  in part (A). The  $t$ -coordinate of  $F$  is  $t_1$ , and the  $t$ -coordinate of  $G$  is  $t_2$ .

(j) On the interval  $(t_1, t_2)$ , which of the following is true about  $d$ ?

- $d$  is positive and increasing.
- $d$  is positive and decreasing.
- $d$  is negative and increasing.
- $d$  is negative and decreasing.

(ii) Describe how the rate of change of  $d$  is changing over the interval  $(t_1, t_2)$ .