
The Chapter Problem—What Time Is It? Questions

- CP1.** Suppose a 50-cm long pendulum is pulled back 30 cm from the rest position. Determine the angle that the pendulum passes through on the first swing. That is, find the angle from its starting point to the point where it changes direction.
- CP2.** How far must the pendulum be pulled back to pass through
(a) a right angle? (b) an angle of 120° ?
- CP3.** How long will the pendulum take to complete the swing? one period?
- CP4.** Assume the pendulum is 80 cm long. How far must it be pulled back from the centre or rest position (horizontal distance), to swing through an angle of $\frac{5\pi}{8}$?
- CP5.** How long will this pendulum take to complete one swing? one period?
- CP6.** Does the pendulum need to be longer or shorter than 80 cm for one swing to occur in 1 s? Explain your reasoning.
- CP7.** A 70-cm long pendulum is released at a distance of 8 cm from rest.
(a) Determine the period and the time of one complete swing.
(b) Graph the function that models this situation. Explain the meaning of positive and negative values of the dependent variable, x .
(c) Determine the pendulum's distance from the rest position after 2 s.
(d) Determine the four possible values for t when the pendulum is 6 cm from the centre point.
- CP8.** Use the model $x = M \cos\left(t\sqrt{\frac{980}{l}}\right)$ to determine an expression that represents the period of the function when $l = 70$ cm.
- CP9.** How long does the pendulum in a grandfather clock take to complete one full period? (A period is two complete swings.)
- CP10.** Use your answers from CP8 and CP9 to create an equation to determine the length of the pendulum in a grandfather clock. Solve the equation.