Section 5.3
Solutions and Hints

by Brent M. Dingle

for the book:
Precalculus, Mathematics for Calculus 4th Edition
by James Stewart, Lothar Redlin and Saleem Watson.

50. A tuning fork is struck producing a pure tone as its tines vibrate. The vibrations are modeled by the function:
$$v(t) = 0.7*\sin(880\pi*t)$$
where v(t) is the displacement of the tines in millimeters at time _t_ seconds.

50a. Find the period of the vibration.

You will first want to write v(t) in the form of $v(t) = y = a*\sin(k*(t - b))$

$v(t) = 0.7*\sin(880\pi*t) = 0.7*\sin(880\pi * (t - 0))$

Thus   amplitude = a = 0.7 millimeters
period = 2π / k = 2π / (880π) = (1/440) seconds   (~= 0.00227 seconds)
phase shift = b = 0

Of course all you need is **period = (1 / 440) seconds**.

50b. Find the frequency of the vibration
(i.e. the number of times the fork vibrates per second).

For this all you need to remember is that frequency = 1 / period.

Thus the frequency = 1 / (1 / 440) = **440 vibrations per second**.

50c. Graph the function v(t).

This is left for you to complete – use your calculator.