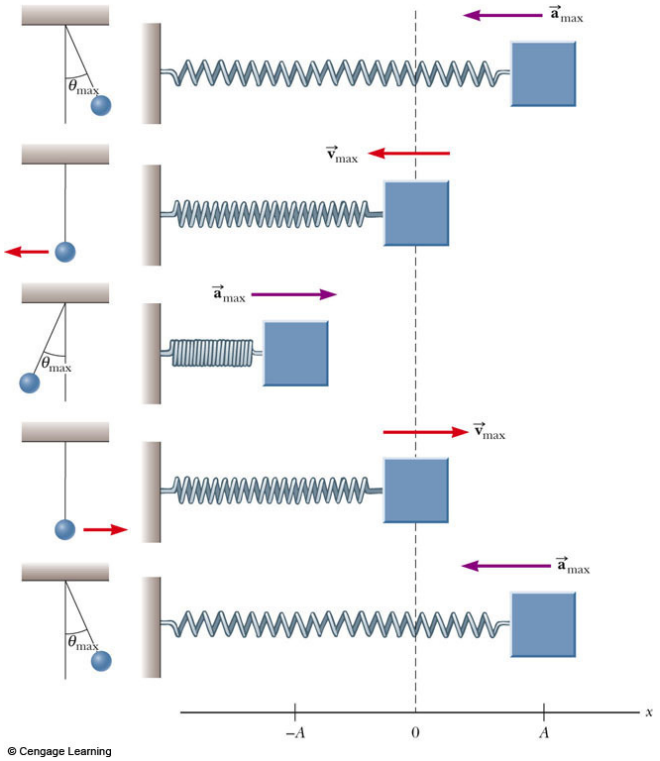
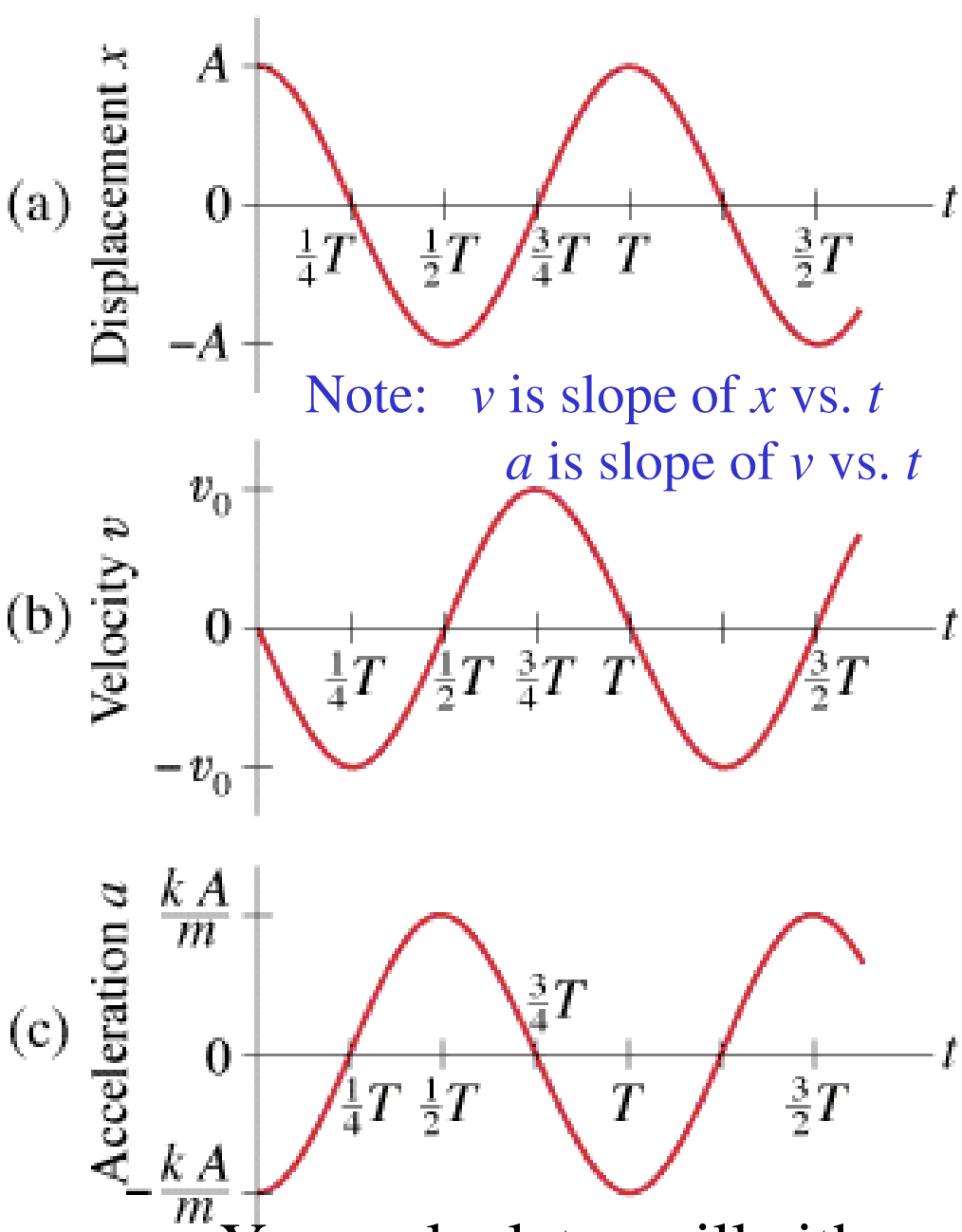
Quiz Today

$$T_{pendulum} = 2\pi\sqrt{\frac{L}{g}}$$





Note: v is slope of x vs. t

a is slope of v vs. t

$$x = A\cos\omega t$$

$$v = -A\omega\sin\omega t$$

$$a = -A\omega^2\cos\omega t$$

$$\omega = 2\pi f = \sqrt{\frac{k}{m}}$$

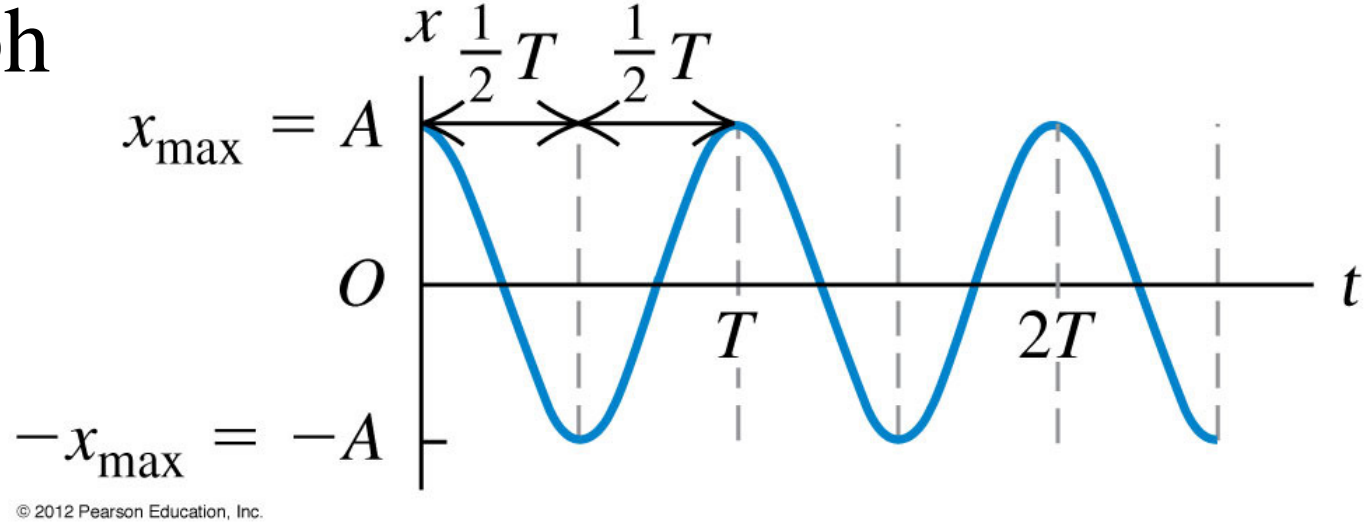
$$a_{\max} = \frac{kA}{m}$$

Your calculator will either need to be in radians to give the correct answer, or you need to convert ωt to degrees.

Options

- Clicker Questions (they are useful to review but don't have to be done in class)
- Your suggestions, which might include practice problems from the book or the practice WebAssign

This is an *x*-*t* graph for an object in simple harmonic motion.



At which of the following times does the object have the *most negative velocity* v_x?

A. $t = T/4$

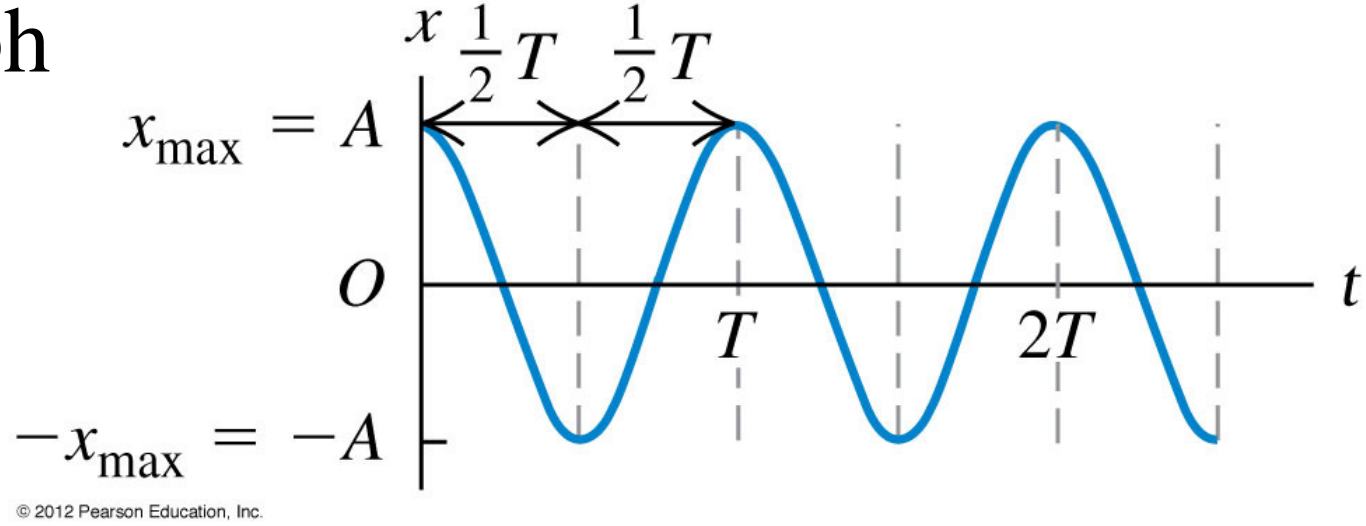
B. $t = T/2$

C. $t = 3T/4$

D. $t = T$

Q146

This is an *x*-*t* graph for an object in simple harmonic motion.



At which of the following times is the *kinetic energy* of the object the greatest?

A. $t = T/8$

B. $t = T/4$

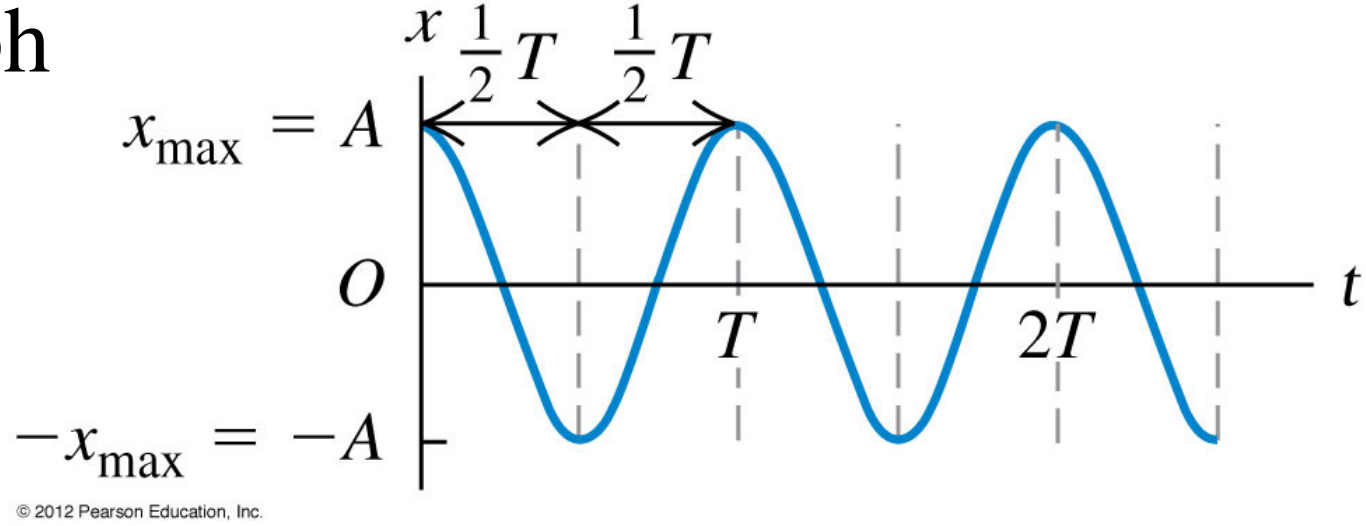
C. $t = 3T/8$

D. $t = T/2$

E. more than one of the above

Q147

This is an *x*-*t* graph for an object in simple harmonic motion.



At which of the following times is the *potential energy* of the spring the greatest?

A. $t = T/8$

B. $t = T/4$

C. $t = 3T/8$

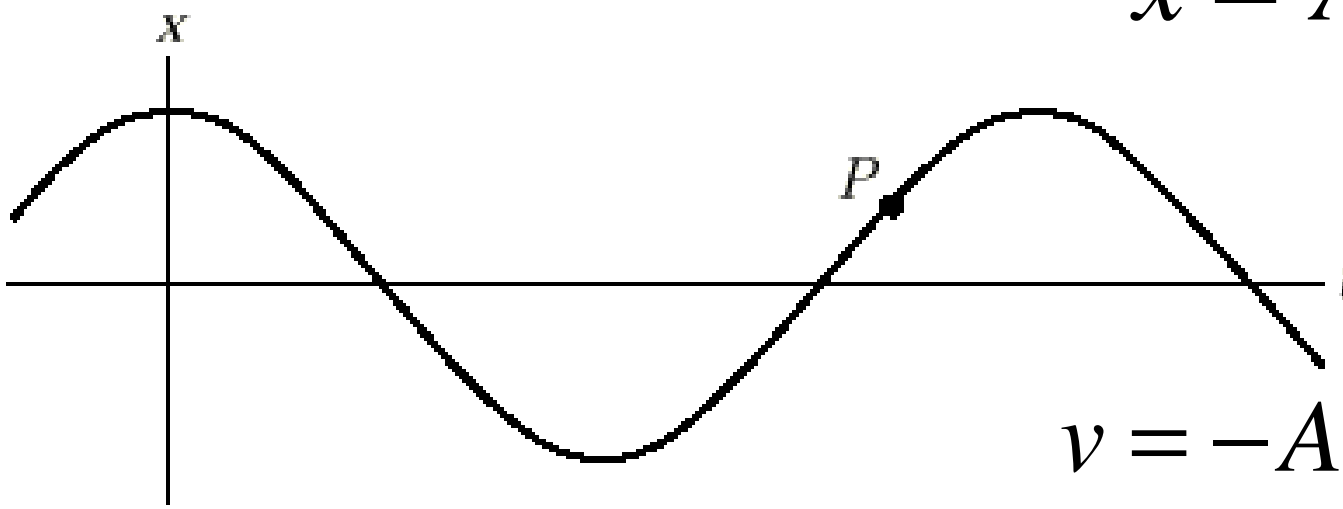
D. $t = T/2$

E. more than one of the above

Q148

A mass attached to a spring oscillates back and forth as indicated in the position vs. time plot below. At point P, the mass has

$$x = A\cos\omega t$$



$$v = -A\omega\sin\omega t$$

$$a = -A\omega^2\cos\omega t$$

A. positive velocity and positive acceleration.
B. positive velocity and negative acceleration.
C. positive velocity and zero acceleration.
D. negative velocity and positive acceleration.
E. negative velocity and negative acceleration.

Q142

A simple pendulum has mass 2 kg and length 1 m. What is the period of the pendulum?

A) 2.0 s

B) 2.8 s

C) 4.4 s

D) 8.9 s

E) 19.7 s

For SHO:

$$T = 2\pi\sqrt{\frac{m}{k_{eff}}}$$

$$F = -mg\sin\theta$$

$$\sin\theta = \frac{z}{L} \approx \frac{x}{L}$$

Q143

A person swings on a swing. When the person sits still, the swing oscillates back and forth at its natural frequency. If, instead, the person stands on the swing, the natural frequency of the swing is

A. greater.
B. the same.
C. smaller.

Q145

Want to go over homework?

A man enters a tall tower, needing to know its height. He notes that a long pendulum extends from the ceiling almost to the floor and that its period is 26.0 s.

(a) How tall is the tower?

(b) If this pendulum is taken to the Moon, where the free-fall acceleration is 1.67 m/s^2, what is the period there?

Chapter/Section: Clicker #=Answer

142=B, 143=A, 145=A, 146=A, 147=B, 148=D