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Course > Final A... > Final A... > 1.2 Exp...

1.2 Exploratory Quiz

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The questions below are to help you think about pendulum motion intuitively.   Try to answer them based on your observations of real pendulums.

We will explore all of this with a model of pendulum motion, so do not be concerned if you don't understand everything at this moment.

Question 1

1/1 point (graded)
As a pendulum swings from left to right, where do you think it is moving **slowest**? Mark all that apply.

- ☑ far to the left of center ✔
- ☐ somewhat left of center
- ☐ at the center of its swing
- ☐ somewhat right of center
- ☑ far to the right of center ✔

✔

Explanation   ✏

The pendulum is moving slowest when it stops to reverse direction at the far left and right extremes of its arc. At this point on its path, the force of gravity has slowed the pendulum's motion to a stop and is accelerating it back toward the center of its arc.

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ⓘ Answers are displayed within the problem

Question 2

1/1 point (graded)
As a pendulum swings from left to right, where do you think it is moving **fastest**? Mark all that apply.

☐ far to the left of center

☐ somewhat left of center

☑ at the center of its swing ✔

☐ somewhat right of center

☐ far to the right of center

✔

Explanation
The pendulum is moving fastest at the center of its swing. Gravity speeds up the pendulum's motion until it reaches this point, beyond which gravity slows it down

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ⓘ Answers are displayed within the problem

Question 3

1/1 point (graded)

Recall $\theta = 0$ at the midpoint of the pendulum's arc when it is hanging straight down. For positions to the right of center, we have $\theta > 0$ and for positions to the left of center, we have $\theta < 0$. When do you think the angular velocity $\frac{d\theta}{dt}$ of the pendulum will be positive? Mark the most appropriate answer below.

- ○ When the pendulum is to the right of center ($\theta > 0$).

- ○ When the pendulum is to the left of center ($\theta < 0$).

- ◉ When the pendulum swings from left to right.

- ○ When the pendulum swings from right to left.

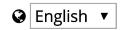- ○ None of the above.

Explanation

The velocity $\frac{d\theta}{dt}$ is positive when the value of θ is increasing with time. In other words, $\frac{d\theta}{dt} > 0$ when the pendulum swings from left to right. Notice that as the pendulum swings from left to right the angle goes from negative to positive, which is why the first two choices are incorrect.

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