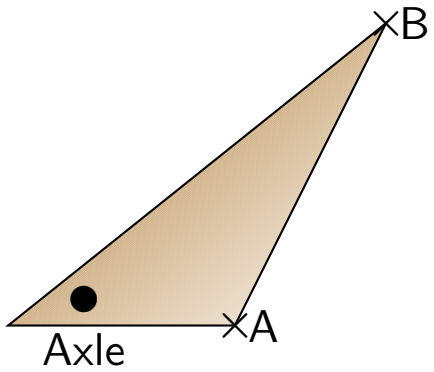
Question 1

A flat triangular plate has an axle that passes perpendicularly through it. The plate rotates counter-clockwise at an increasing rate.

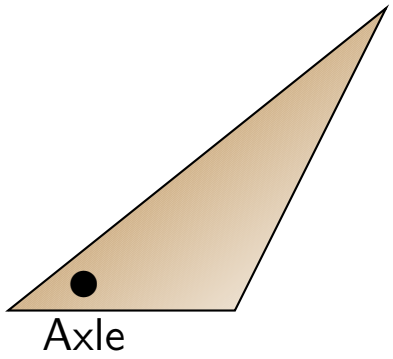


Which of the following is true regarding angular velocities of the two marked points at the same instant?

1. $\omega_A = \omega_B = 0$
2. $\omega_A = \omega_B \neq 0$
3. $\omega_A > \omega_B$
4. $\omega_A < \omega_B$

Question 2

A flat triangular plate has an axle that passes perpendicularly through it. The plate rotates clockwise at an decreasing rate.



Which of the following is true?

1. $\omega > 0$ and $\alpha > 0$
2. $\omega > 0$ and $\alpha < 0$
3. $\omega < 0$ and $\alpha > 0$
4. $\omega < 0$ and $\alpha < 0$

Warm Up Question 1

Assume that Earth rotates at a constant rate. Consider any two locations on Earth. Are the angular velocities at these locations the same or different? Are the magnitudes of the linear velocities the same or different? Explain your answers.

1. Angular velocity same. Linear velocity magnitudes different.
2. Angular velocities different. Linear velocity magnitudes different.
3. Angular velocities different. Linear velocity magnitudes same.

Warm Up Question 2

A bicycle wheel about a horizontal axle though its center. The wheel rotates counterclockwise at a constantly increasing rate (as illustrated in Fig 12.2). Describe the direction of the acceleration at a point on the rim at the bottom of the wheel. Explain your answer.

1. Up. Radially inward because of centripetal acceleration.
2. Centripetal up, tangential right.
3. Diagonal up and right.
4. Up and left.
5. Directly right.

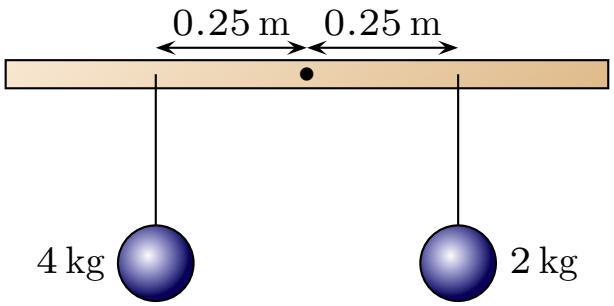
Warm Up Question 3

An axle passes through one end of a meter stick. A $10\,\mathrm{N}$ force pulls perpendicular to and at the other end the stick. The point of application of this force is then shifted to a point $25\,\mathrm{cm}$ from the axle and the force stays constant. Describe as precisely as possible how this changes the torque exerted by the force on the stick. Explain your answer.

1. It will be $1/4$ because of the distance.
2. It will be less. Distance is less.
3. Drops from $10\,\mathrm{Nm}$ to $2.5\,\mathrm{Nm}$.

Question 3

A meter stick can pivot about its midpoint. Two balls are suspended equal distances from the center.



Which of the following best describes the net torque on the meter stick?

1. $\tau_{\text{net}} = 0$
2. $\tau_{\text{net}} > 0$
3. $\tau_{\text{net}} < 0$