Warm Up

1. You are pushing a refrigerator along the kitchen floor and need to apply 100. N to get it moving. If the refrigerator has a mass of 100. kg, what is the coefficient of friction?
2. What is the mass of an object that applied 900. N of force over 2.15 sec and was traveling at 15.0 m/s?

Targets

- I can describe circular motion and solve for variables related to it.

Circular Motion

- Uniform circular motion involves the movement of an object in a trajectory around a circle with a fixed radius.
- Acceleration is always towards the center of the circle or centripetal acceleration.

- The object is moving at a constant velocity forward but acted on by the acceleration towards the center.
- This produces the circular motion.

Period and Frequency

- The time it takes to make one complete revolution is the period.
  - $T=1/f$
- The number of rotations in 1 second is the frequency.
  - $f=1/T$

- The area of a circle is $2\pi r$.
- To find the velocity in of an object moving in a circle, you divide the area by the period to make one revolution.
- $2\pi r/T = v$

- The centripetal acceleration can be found with $a_c = v^2/r$
- Centripetal force is a measure of the force or tension towards the center of the circle.
- Centripetal force can be found with $F_{net} = ma_c$

Practice

- A car racing on a flat track travels at 22 m/s around a curve with a 56 m radius. Find the car's centripetal acceleration.
- $A_c = 8.6\ m/s^2$

Practice

- An airplane traveling at 201 m/s makes a turn. What is the smallest radius of the circular path (in km) that the pilot can make and keep the centripetal acceleration under 5.0 m/s^2?
- 8.1 km

Practice

- A 45 kg merry-go-round worker stands on the ride's platform 6.3 m from the center. If her speed as she goes around the circle is 4.1 m/s, what is the force of friction necessary to keep her from falling off the platform?
- Answer = 120 N

Summary

- Centripetal acceleration and force are center seeking.

Assignment

- Circular Motion Assignment