

# ALGEBRA-BASED PHYSICS-1: MECHANICS (PHYS135A-01): EXAMPLE PROBLEMS FILE

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## CHAPTER 6

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**Conceptual Question 2.** *Can centripetal acceleration change the speed of circular motion? Explain.*

**Conceptual Question 2.** Answer: No, it only changes the direction. Figure 6.8 in the text shows that the velocity only changes direction, not magnitude, for uniform circular motion.

**Conceptual Question 6.** *Race car drivers routinely cut corners as shown in Figure 6.32. Explain how this allows the curve to be taken at the greatest speed.*

**Conceptual Question 6.** Answer: Path 2 in the figure has a larger radius of curvature. Widening the radius of curvature lowers the necessary centripetal force. Assuming the tires are providing the maximum possible static friction, a larger radius of curvature allows for a larger velocity while maintaining traction (static friction).

**Conceptual Question for Newton's Law of Gravitation.** *Two objects of equal mass are drifting toward each other. If the acceleration experienced by each is  $5g$  when the objects are  $5000\text{ km}$  apart, what is the acceleration when they are  $2500\text{ km}$  apart?*

**Conceptual Question for Newton's Law of Gravitation.** Answer: If the distance decreases by a factor of two, the force of gravity must increase by a factor of four. Remember that by Newton's Third Law, the force of the first object on the second is equal and opposite to the force of the second object on the first. But the force is equal to  $m\vec{a}$ , so if the masses are equal then the accelerations are equal. The acceleration will increase by a factor of 4.0, from 5g to 20g.



## ANSWERS

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