



Standardized Test Prep

MULTIPLE CHOICE

1. An object moves in a circle at a constant speed. Which of the following is *not* true of the object?
- A. Its centripetal acceleration points toward the center of the circle.
 - B. Its tangential speed is constant.
 - C. Its velocity is constant.
 - D. A centripetal force acts on the object.

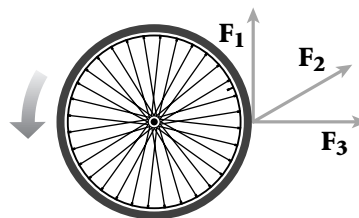
Use the passage below to answer questions 2–3.

A car traveling at 15 m/s on a flat surface turns in a circle with a radius of 25 m.

2. What is the centripetal acceleration of the car?
- F. $2.4 \times 10^{-2} \text{ m/s}^2$
 - G. 0.60 m/s^2
 - H. 9.0 m/s^2
 - J. zero
3. What is the most direct cause of the car's centripetal acceleration?
- A. the torque on the steering wheel
 - B. the torque on the tires of the car
 - C. the force of friction between the tires and the road
 - D. the normal force between the tires and the road
4. Earth ($m = 5.97 \times 10^{24} \text{ kg}$) orbits the sun ($m = 1.99 \times 10^{30} \text{ kg}$) at a mean distance of $1.50 \times 10^{11} \text{ m}$. What is the gravitational force of the sun on Earth? ($G = 6.673 \times 10^{-11} \text{ N}\cdot\text{m}^2/\text{kg}^2$)
- F. $5.29 \times 10^{32} \text{ N}$
 - G. $3.52 \times 10^{22} \text{ N}$
 - H. $5.90 \times 10^{-2} \text{ N}$
 - J. $1.77 \times 10^{-8} \text{ N}$

5. Which of the following is a correct interpretation of the expression $a_g = g = G \frac{m_E}{r^2}$?
- A. Gravitational field strength changes with an object's distance from Earth.
 - B. Free-fall acceleration changes with an object's distance from Earth.
 - C. Free-fall acceleration is independent of the falling object's mass.
 - D. All of the above are correct interpretations.
6. What data do you need to calculate the orbital speed of a satellite?
- F. mass of satellite, mass of planet, radius of orbit
 - G. mass of satellite, radius of planet, area of orbit
 - H. mass of satellite and radius of orbit only
 - J. mass of planet and radius of orbit only
7. Which of the following choices correctly describes the orbital relationship between Earth and the sun?
- A. The sun orbits Earth in a perfect circle.
 - B. Earth orbits the sun in a perfect circle.
 - C. The sun orbits Earth in an ellipse, with Earth at one focus.
 - D. Earth orbits the sun in an ellipse, with the sun at one focus.

Use the diagram below to answer questions 8–9.



8. The three forces acting on the wheel above have equal magnitudes. Which force will produce the greatest torque on the wheel?
- F. F_1
 - G. F_2
 - H. F_3
 - J. Each force will produce the same torque.