A car is rounding an unbanked circular turn with a speed of v = 35 m/s. The radius of the turn is r = 1500 m. What is the magnitude ac of the car's centripetal acceleration?
0.82 m/s2, 1.8 × 106 m/s2, 0.023 m/s2, 5.4 × 10-4 m/s.

Solution

The magnitude a_c of the car's centripetal acceleration be given by formula:

$$a_c = \frac{v^2}{r},$$

where v - a speed of a car, r - the radius of the turn.

Let's find a_c:

$$a_c = \frac{\left(35\frac{\text{m}}{\text{s}}\right)^2}{1500 \text{ m}} = 0.82\frac{m}{s^2}.$$

Answer: $0.82\frac{m}{s^2}$.