

Date: _____

The Masters School
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Physics

1. An airplane is flying in a horizontal circle at a speed of 120 m/s. The 72.0 kg pilot does not want his centripetal acceleration to exceed 8.00 times free-fall acceleration. What is the minimum radius of the circular path? (Your answer should be between 150 – 200 m)

2. Tarzan ($m = 85 \text{ kg}$) tries to cross a river by swinging from a 10.0 m long vine. His speed at the bottom of the swing, just as he clears the water, is 8.0 m/s . Tarzan doesn't know that the vine has a breaking strength of $1.0 \times 10^3 \text{ N}$. Does he make it safely across the river without breaking the vine? Explain your answer through mathematical reasoning. (Your answer should be between $800 - 1200 \text{ N}$)

3. A 12250 N car attempts to round a 63 m turn traveling at 50 mph, approximately 22.35 m/s.
- Find the centripetal acceleration of the car. (Your answer should be between $7 - 10 \text{ m/s}^2$.)
 - Find the force that maintains centripetal acceleration. (Your answer should be between $8 - 10 \times 10^3 \text{ N}$)
 - Find the minimum coefficient of static friction between the tires and the road that will allow the car to round the curve safely. (Your answer should be between 0.60 - 0.90)