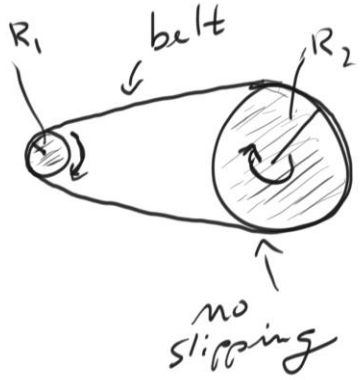
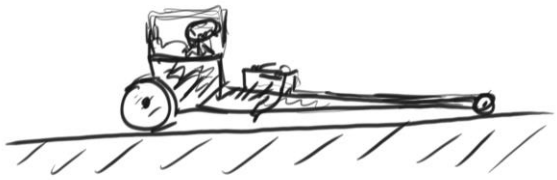
Physics 10 Problem set 7 Rotation

1. A car's speedometer measures the speed by the rotation of the tires, the faster the rotation of the tire, the faster the speed of the car. If the car had larger than usual tire diameters, would the speedometer read a higher or lower than correct value?

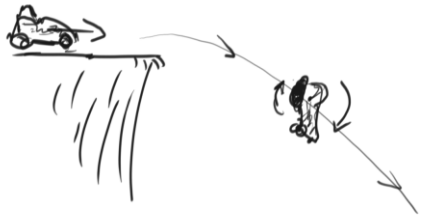
2. A large wheel and a small wheel are connected by a belt (like a fan belt in a car) that never slips over the wheels as the both turn. Which wheel, the larger or smaller, will have a greater angular velocity?



3. The front wheels of a drag racer are located very far in front of the rear wheels. Why?

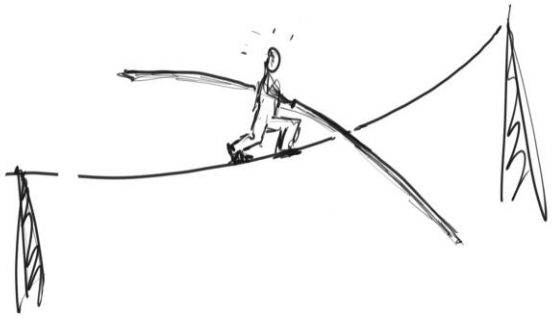


4. When a car drives off a cliff it will start to rotate as it is leaving the ground. Will the final angular velocity of the car, after it has left the cliff completely, be greater or smaller if the car is travelling quickly before it leaves the ground?



5. Why does the front end of a car rotate upward when the car is accelerating forward and downward when braking?

6. What two effects are present for the tightrope walker to walk and be more stable using a pole and bending their knees.



7. Why is the wobble of a star considered evidence of the presence of a planet in orbit about it?

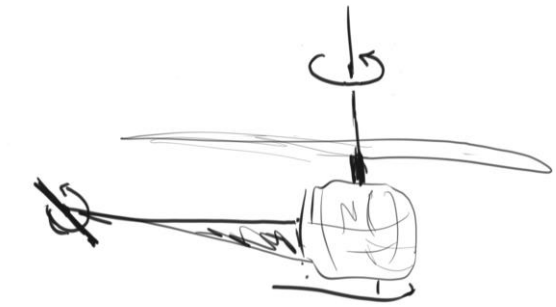
8. Why do you bend forward when carrying a heavy pack on your back?

9. Can an object travel along a curved path with no forces acting on it?

10. If a turn is “banked” (sometimes referred to as the camber of the turn) correctly then, at one given speed, a car would need no friction to successfully complete the turn. In this case, what force on the car causes its centripetal acceleration?

11. If the Earth’s polar ice caps melted, how would the angular velocity of the earth change as a consequence? Would a day be longer or shorter?

12. Why does a helicopter have two spinning blades that are perpendicular to each other?



13. As a dust cloud of gas in outer space gravitates together (perhaps in forming a star or planet), will the cloud start to spin faster or slower?