Here's a Fun Problem

After imbibing several quarts of eggnog at your relative's house, you stumble awkwardly into the minivan waiting outside. You are so full and drowsy that you are unable to fully close the swinging car door, which is of uniform mass density. Instead, you close the door only to the point where there is an angle of $\frac{\pi}{180} << 1$ between where the car door is and where it should be. Exhausted, you take your hand off of the car door, and the car starts to accelerate forward. In a few seconds the door has slammed shut without any additional action on your part. Find the amount of time that it takes the door to do so, in terms of the length L of the door and the acceleration a of the car. (Taylor approximate appropriately.)