**Problem 1:** A suitcase is pulled 50ft along a horizontal sidewalk with a constant force of 30lb at an angle of 30° above the horizontal. How much work is done?

Problem 2: A constant force of $\vec{F} = \langle 2, 4, 1 \rangle$N moves an object from $(0, 0, 1)$m to $(2, 4, 6)$m. How much work is done?

Problem 3: An object on an inclined plane does not slide provided the component of the object's weight parallel to the plane $|\vec{W}_{\text{par}}|$ is less than or equal to the magnitude of the opposing frictional force $|\vec{F}_f|$. The magnitude of the frictional force, in turn, is proportional to the component of the object's weight perpendicular to the plane $|\vec{W}_{\text{perp}}|$. The constant of proportionality is the coefficient of static friction $\mu > 0$. Suppose a 100lb block rests on a plane that is tilted at an angle of $\theta = 30°$ to the horizontal. What is the smallest possible value of μ?
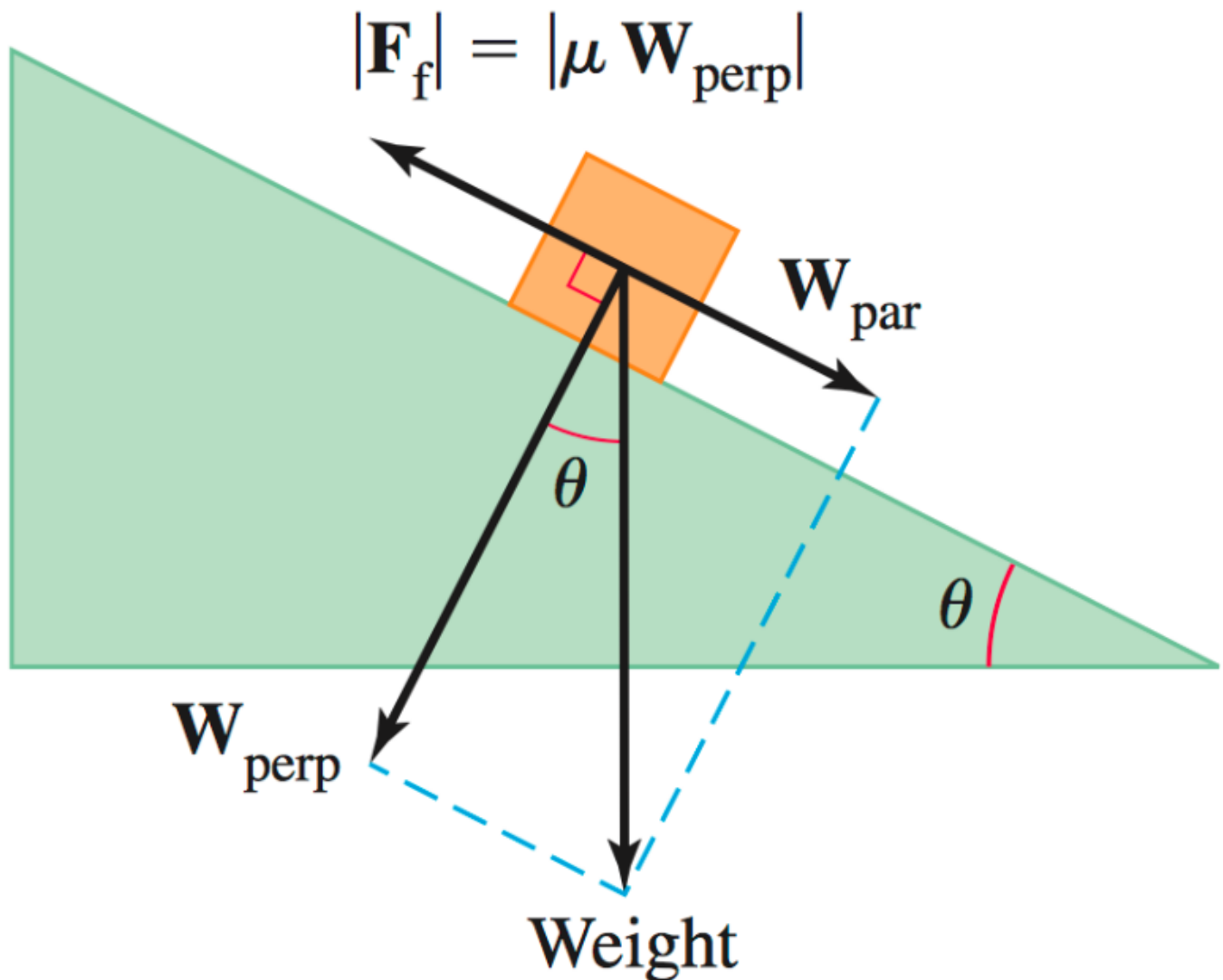
Problem 4: A cue ball in a billiards video game lies at P(25, 16). We assume that each ball has a diameter of 2.25 screen units, and pool balls are represented by the point at their center.

    a. The cue ball is aimed at an angle of 58° above the negative x-axis toward a target ball at A(5, 45). Do the balls collide?

    b. The cue ball is aimed at the point (50, 25) in an attempt to hit a target ball at B(76, 40). Do the balls collide?

    c. The cue ball is aimed at an angle θ above the x-axis in the general direction of a target ball at C(75, 30). What range of angles (for $0 \le \theta \le \frac{\pi}{2}$) will result in a collision? Express your answer in degrees.