1. Look at Figure 4-6 of the textbook. Is the angular velocity vector for the golf club pointing out of the page or into the page? Assuming that the club head speeds up as it approaches the ball on the downstroke, is the angular acceleration of the golf club pointing out of the page or into the page?

2. At the moment when a baseball player’s bat makes contact with the ball, what is the direction of the angular velocity vector? What is the direction of the angular acceleration vector? Draw a sketch to illustrate your answer and label the velocity and acceleration vectors on your sketch.

3. Estimate the length of a baseball pitcher’s arm in meters. Estimate the amount of time in seconds that it takes the pitcher to swing their arm through the final 90° (1/4 revolution) of a fastball pitch. Use these estimated values to estimate the speed (in m/s) at which the baseball is released towards the batter, assuming that the arm travels at a constant angular velocity during the last 90° of the pitch.

4. If a bike wheel with radius 0.5m is rotating 10 times per second, what is the radial acceleration at the outer rim of the wheel? How many “g’s” is this? Remember that g is approximately 10 (m/s)/s.