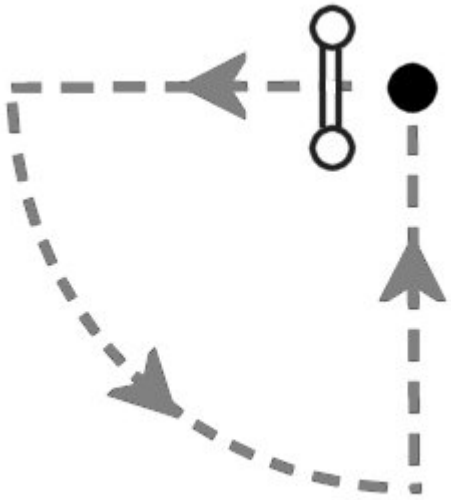
Answer #308

The answer is (b): I will have rotated clockwise as viewed from above and will be at rest, as seen in an mpeg video by clicking your mouse on the photograph below.



Note that the system initially has zero angular momentum, so at the end, when I am at rest on the rotating chair the system must also have zero angular momentum - that is, it must be at rest.

Moving the barbell radially outward involves *no* angular momentum about the center of the rotating chair, that motion will not affect the rotation of the chair.

On the other hand, when I move the barbell azimuthally (the circular motion of my arm between when I extend my arm and when I pull it back) this involves angular momentum about the central vertical axis of the chair. The vector representing this angular momentum is in the upward direction, so to compensate I must rotate on the chair in the opposite direction, clockwise as viewed from above. Each 90^{o} rotation of the barbell causes a lesser rotation of the chair with me on it, as seen in the video. Moving the weight in the opposite direction will cause the chair to rotate counterclockwise, as seen in this video. Click here to see movement back and forth in a single video.

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