A basketball player makes a jump shot. The .6-kg ball is released at a height of 2 m above the floor with a speed of 7.2 m/s. the ball goes through the net 3.2 m above the floor at a speed of 4.2 m/s. what is the work done on the ball by air resistance, a non conservative force?

Solution

$$E_1 = K_1 + P_1 = \frac{mv_1^2}{2} + mgh_1$$

$$E_2 = K_2 + P_2 = \frac{mv_2^2}{2} + mgh_2$$

the work done on the ball by air resistance

$$A = E_1 - E_2 = \frac{mv_1^2}{2} + mgh_1 - \frac{mv_2^2}{2} - mgh_2$$

$$A = \frac{m(v_1^2 - v_2^2)}{2} + mg(h_1 - h_2) = \frac{0.6(7.2^2 - 4.2^2)}{2} + 0.6 * 9.8(2 - 3.2)$$
$$= 10{,}26 - 7.06 = 3.2 \text{ J}$$