

6. We use Eq. 7-12 for  $W_g$  and Eq. 8-9 for  $U$ .

- (a) The displacement between the initial point and  $Q$  has a vertical component of  $h - R$  downward (same direction as  $\vec{F}_g$ ), so (with  $h = 5R$ ) we obtain  $W_g = \vec{F}_g \cdot \vec{d} = 4mgR$ .
- (b) The displacement between the initial point and the top of the loop has a vertical component of  $h - 2R$  downward (same direction as  $\vec{F}_g$ ), so (with  $h = 5R$ ) we obtain  $W_g = \vec{F}_g \cdot \vec{d} = 3mgR$ .
- (c) With  $y = h = 5R$ , we find  $U = 5mgR$  at  $P$ .
- (d) With  $y = R$ , we find  $U = mgR$  at  $Q$ .
- (e) With  $y = 2R$ , we find  $U = 2mgR$  at the top of the loop.
- (f) The new information ( $v_i \neq 0$ ) is not involved in any of the preceding computations; the above results are unchanged.