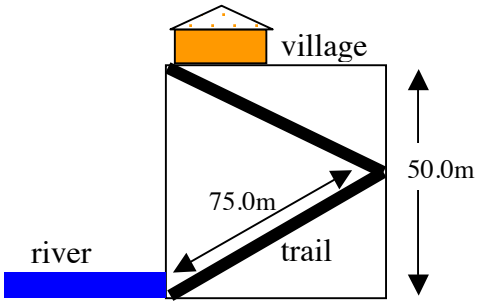
1. A river flows past the base of a 50.0m cliff on which a village rests. Water can be brought up in two ways. The first method uses a pulley system that lifts a 3.00kg bucket vertically upward. The second way is to carry the bucket up the trail from the river to the village. The trail consists of two straight trail each 75.0m long as shown at the right. Find the work done by gravity on a bucket of water if the bucket is (a)lifted vertically with the pulleys and (b)carried up along the trail. (c)Find the total work done by gravity if the bucket was lifted vertically, then carried back to the river on the trail. Explain the meaning of your answer.



2. Suppose that there is very little friction in the pulley system. Compare the work done by friction using the pulleys to the work done by friction to drag the bucket up the trail. Explain what this tells you about the frictional force.

3. A 747 airliner filled with passengers has a mass of about 450,000kg. Find its potential energy relative to the ground when it is cruising at 12,000m. Explain where this energy came from.

4. Each wheel in your car rests on a spring that has a spring constant of about 25,000N/m. Find the energy that gets stored in one of the springs when you go over a 12.0cm high speed bump.