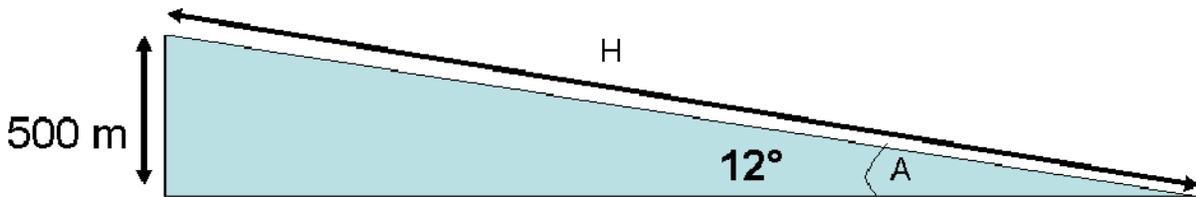


Calculating the length of a side

Length of a path up a hill



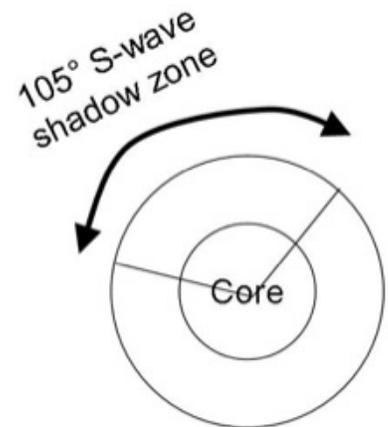
1. You are walking up a 500 meter high hill. The trail has an incline of 12 degrees. How far will you walk to get to the top?

Depth to a bed of coal

2. You note that a bed of coal is tilted at 12 degrees and comes to the surface 6 kilometers from your property. How deep will you have to dig to get to the coal bed on your property?

Calculating radius of the outer core (seismology)

3. The S wave shadow zone is caused by the outer core not transmitting S waves. It crosses an arc of 105 degrees on the Earth (see the diagram on the left). Estimate the radius of the outer core. The radius of the entire Earth is 6370 km.



Calculating an angle

Stream gradient

4. The Colorado river drops from 3200 feet at Lake Mead to 900 feet elevation at Lee's Ferry, a river distance of 270 miles. What is the gradient in degrees?

Angle of Repose



5. The angle of repose is the steepest angle at which dry, unconsolidated sediment is stable. You create a conical pile of sand that is as steep as you can make it. The pile is 11 cm high and has a radius of 16 cm. What is the angle of repose of this

Plate tectonics and the angle of subduction

6. Subducting oceanic slabs can plunge steeply or shallowly underneath the overriding plate. In modern subduction zones the location of earthquakes can show how steeply the subducting slab is plunging into the mantle, however in ancient subduction zones we cannot use this technique. Instead, we can use the observation that a volcanic arc typically occurs above the point at which the subducting plate reaches a depth of 100 km. If an ancient volcanic arc was 200 km from the trench that marks the initiation of subduction, what is the angle of subduction?

