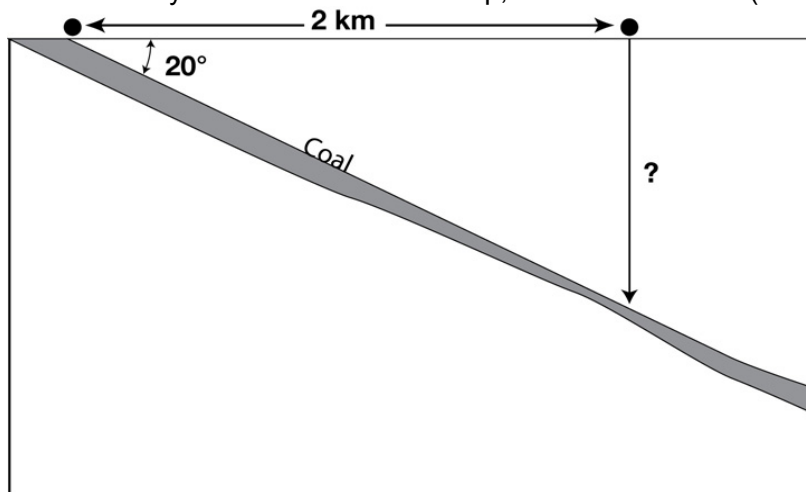


Structure of Rock Bodies

I. Geometry of Dipping Beds (First, read about strike and dip in your text. There are also some helpful visuals [here](#) and [here](#) and [here](#).)

The problem: An important bed of coal dips at an angle of 20 degrees to the ground surface, which is horizontal. Where the bed crops out at the surface, the coal has been mined out. You are considering the feasibility of mining it underground. You have acquired the necessary permits and permission to dig a vertical mine shaft 2 km away from the surface outcrop, and mine the coal (see figure).

1. How deep will you have to drill to reach the top of the coal bed? Assume that the surface is horizontal and that the dip and strike of the coal bed are constant. (Hint: Do you remember the basic [trigonometric functions](#) (sine, cosine, tangent) as they apply to triangles? If not, go to



http://www.mathsrevision.net/gcse/sin_cos_tan.php for a refresher. A set of trig tables can be found [here](#) . A word of caution: if you use your calculator be sure that it is set to accept data in degrees and not radians. Show all of your calculations.

II. Uplift and Erosion of Mountain Belts

The development and eventual erosion of mountain belts are fundamental to the development of many continental landscapes, including folded mountain belts, shields, and even mountain ranges in continental rifts. The calculations below are intended to help you understand the rates and processes involved in the development of a mountain belt.

1. Careful GPS surveys show that the crust below a certain mountain belt at a convergent plate margin is rising at an average rate of 1.4 mm/year. Geologic studies suggest that the deformation and uplift have been going on for about 10 million years. How much uplift (in km) would be accomplished over this period of time?
2. Because of extensive erosion during uplift of the crust, deep rocks are eventually exposed at the surface to form a continental shield. Careful measurements of the rate of erosion in the mountain range suggest an erosion rate of about 0.7 mm/y. Estimate about how high the mountain belt would be after 10 million years of combined uplift and erosion.

III. Faults

Faults are important elements of the structure of rock bodies. Look at each of the six images below and determine if the faults shown are normal, reverse (thrust), or strike-slip. If strike-slip, then is it left-lateral or right-lateral?

Submit your answers to Blackboard by the due date announced in class.



A



B



C



D



E



F