

1. Provide accurate, concise, geophysically relevant definitions and/or explanations for the following items:

a. Tidal friction

b. Airy versus Pratt isostasy

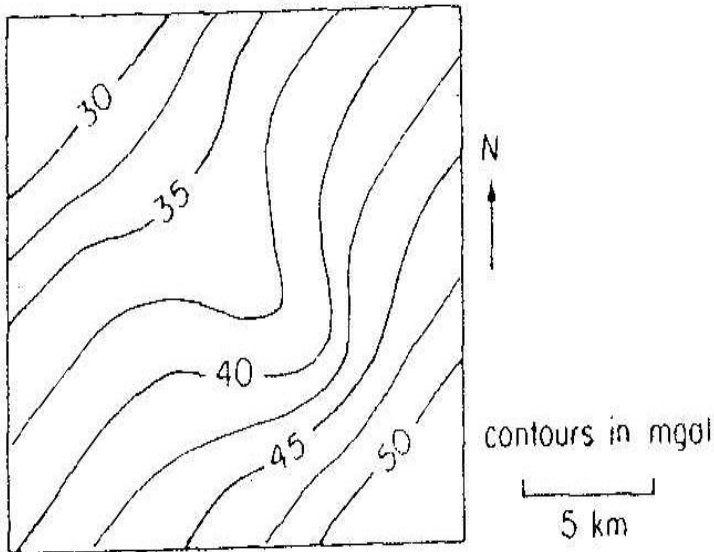
c. Free air gravity anomaly

d. Regional and residual separation

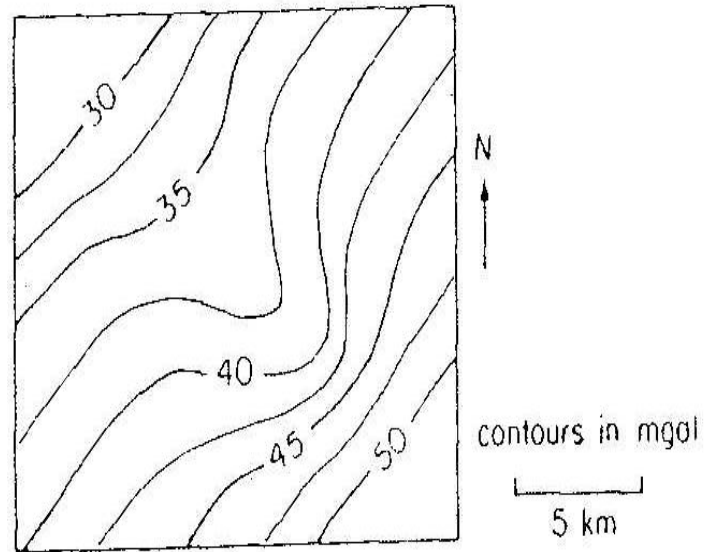
2. Examine the complete Bouguer anomaly map shown below. Assume the regional gravity variation is caused by a lateral change in the thickness of the crust. **Work on the large copies on last two pages**

a. Draw contours for the regional on the left map and the residual on the right hand map; use a 2.5 mgal contour interval. Indicate (hachure) lows or highs. **Neatness and accuracy count here.**

**Contour the regional:**



**Contour the residual:**



b. Which explanation of the local Bouguer anomaly is most probable? Sedimentary rocks of density  $2,500 \text{ kg/m}^3$  are intruded by (1) rock salt with density  $2,200 \text{ kg/m}^3$  or (2) granite with a density of  $2,750 \text{ kg/m}^3$ . Explain and justify your thinking.

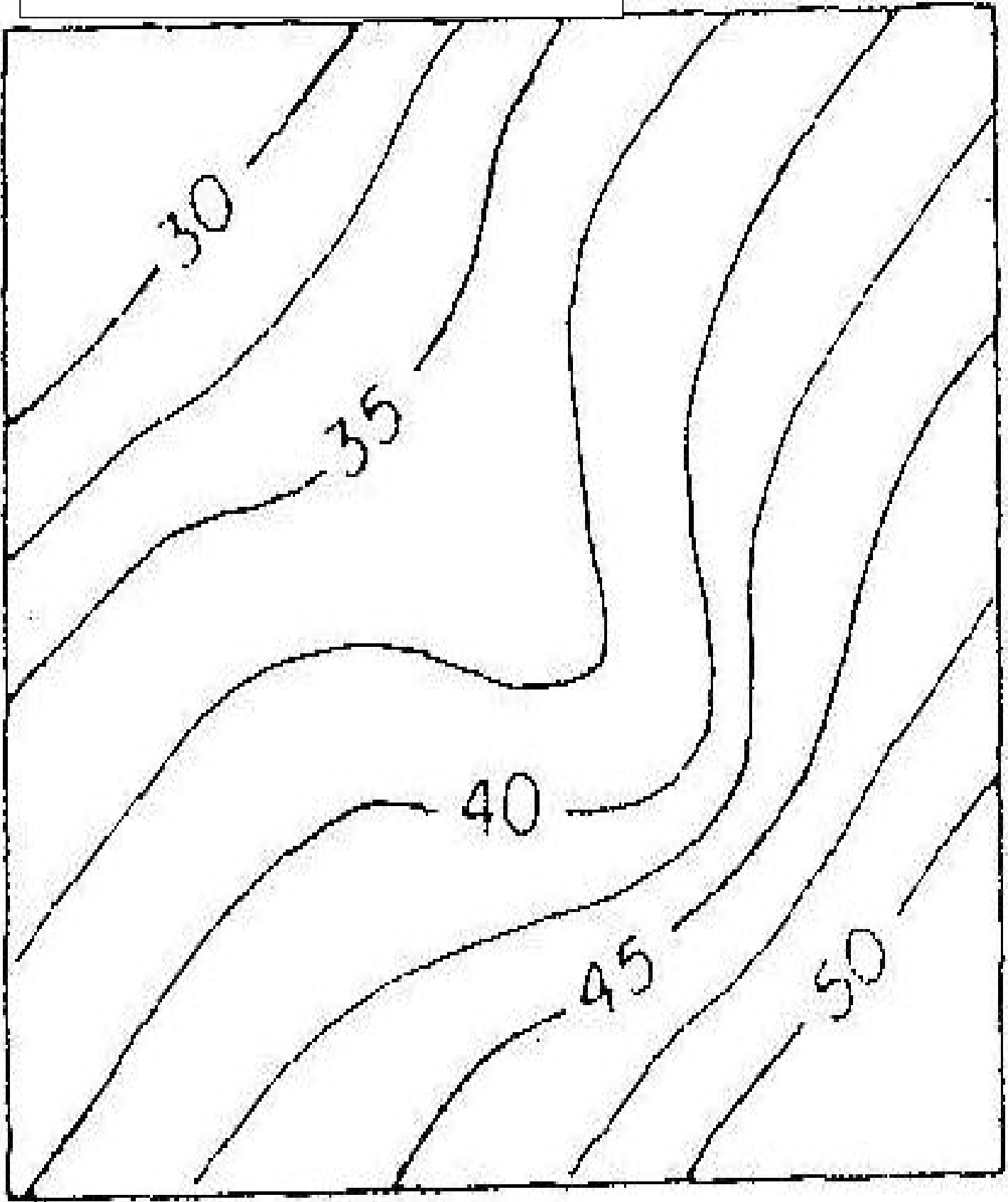
c. In which direction is the crust thickening? Why?

3. Here's the promised Airy isostatic balance problem. Start in Missoula with continental crust in isostatic equilibrium. It is 40 km thick, the surface at 1000 meters above sea level, crustal density equals  $2700 \text{ kg/m}^3$ , and it is floating in  $3200 \text{ kg/m}^3$  mantle above a compensation depth 100 km below sea level. Now, suppose we get smacked with an errant asteroid and blast away 20% (8 km) of the crust.

a. How much accommodation space is developed?

b. How much basalt ( $3000 \text{ kg/m}^3$ ) can you flood into the hole before the surface is back to sea level?  
Note, this is a second isostatic calculation,

Contour the REGIONAL



Contour the RESIDUAL

