Our error last class was that we used a tracer travel time of 7 min for 30cm but it was the length of the tube which is 30 inches
SO calculation of K was fine BUT effective porosity was not

$Q = KiA$

$K = \frac{Q}{iA}$

$Q = \frac{1.5cm^3}{sec}$

$$K = \frac{\left[\frac{90\ ml\ \frac{1cm^3}{1ml}}{60\ sec}\right]}{\left[\frac{(17.5 - 10.8)in\ (2.54cm/in)}{(45cm)}\right]\left[\pi\left(1\ in\ \frac{2.54cm}{in}\right)^2\right]} = \frac{0.2\ cm}{sec}$$

$i = 0.37$

$A = 20cm^2$

Reasonable for sand?

Yes see:
http://en.wikipedia.org/wiki/Hydraulic_conductivity#Ranges_of_values_for_natural_materials

---

Our error last class was that we used a tracer travel time of 7 min for 30cm but it was the length of the tube which is 30 inches
SO the effective porosity calculation was wrong, correcting that:

Calculate Effective Porosity using data from Darcy Apparatus

What measurements will you need?

Travel time of a tracer through the sand =

What equation will you solve?

$$\phi = \frac{V_{darcy}}{V_{tracer}} = \frac{\frac{Q = \frac{1.5cm^3}{sec}}{A = 20cm^2}}{\frac{30in\ 2.54cm/in}{7min\ 60sec/min}} = \frac{0.075\ cm/sec}{0.18\ cm/sec} = 0.41$$

I got the column up and running again after class and collected new data

$Q = KiA$

$K = \frac{Q}{iA}$

$Q = \frac{2.3\,cm^3}{sec}$

Recall the sand has been removed and replaced since the prior measurements, so we do not expect the same value of K

$$K = \frac{\left[\dfrac{140\ ml\ \frac{1cm^3}{1ml}}{60\ sec}\right]}{\left[\dfrac{(2.5)in}{(45cm)\ (1in/2.54cm)}\right]\left[\pi\left(1\ in\ \frac{2.54cm}{in}\right)^2\right]} = \frac{0.8\ cm}{sec}$$

$i = 0.14$ $A = 20cm^2$

Reasonable for sand?

Yes see:

http://en.wikipedia.org/wiki/Hydraulic_conductivity#Ranges_of_values_for_natural_materials

Calculate Effective Porosity using data from Darcy Apparatus

What measurements will you need?

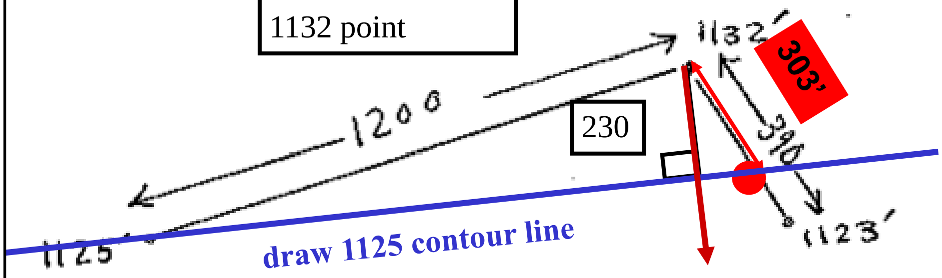
Travel time of a tracer through the 30 inch tube = 300 sec

What equation will you solve?

$$\phi = \frac{V_{darcy}}{V_{tracer}} = \frac{\dfrac{Q= \frac{2.3cm^3}{sec}}{A= 20cm^2}}{\dfrac{30in\ \frac{2.54cm}{in}}{300\ sec}} = \frac{0.1\ cm/sec}{0.254\ cm/sec} = 0.39$$

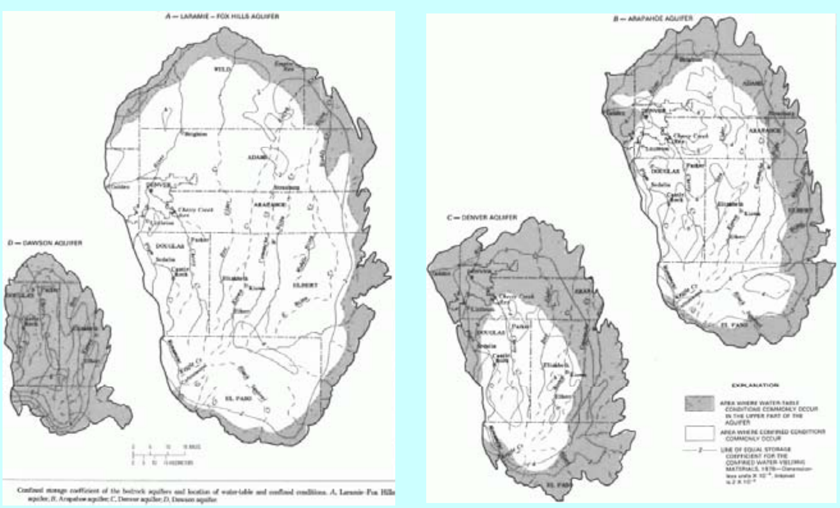
by construction draw the perpendicular from the 1125 contour to the 1132 point

assume linear head drop so 1125 occurs 7/9 of the way between 1132 and 1123 (7/9)*390 = 303'



i = (1132-1125) / 230 ~ 0.03

Distribution of Unconfined / Confined



Given what you now know about the Denver Basin, what do you expect the flow patterns and head distribution would be?
Sketch on the maps above or draw maps/sections on scratch paper

Heads