Problem 1

Recovery Test Analysis

time on = 720 min

t'(min)	t/t'	s'(min)
1	721.00	2.94
2	361.00	2.80
3	241.00	2.68
5	145.00	2.51
7	103.86	2.38
10	73.00	2.21
15	49.00	2.04
20	37.00	1.90
30	25.00	1.65
40	19.00	1.55
50	15.40	1.31
60	13.00	1.22
80	10.00	1.07
100	8.20	1.03
120	7.00	0.90
180	5.00	0.86
240	4.00	0.73
300	3.40	0.64
360	3.00	0.57
420	2.71	0.52
480	2.50	0.48
600	2.20	0.41

$t/t' = \frac{720 + t'}{t'}$

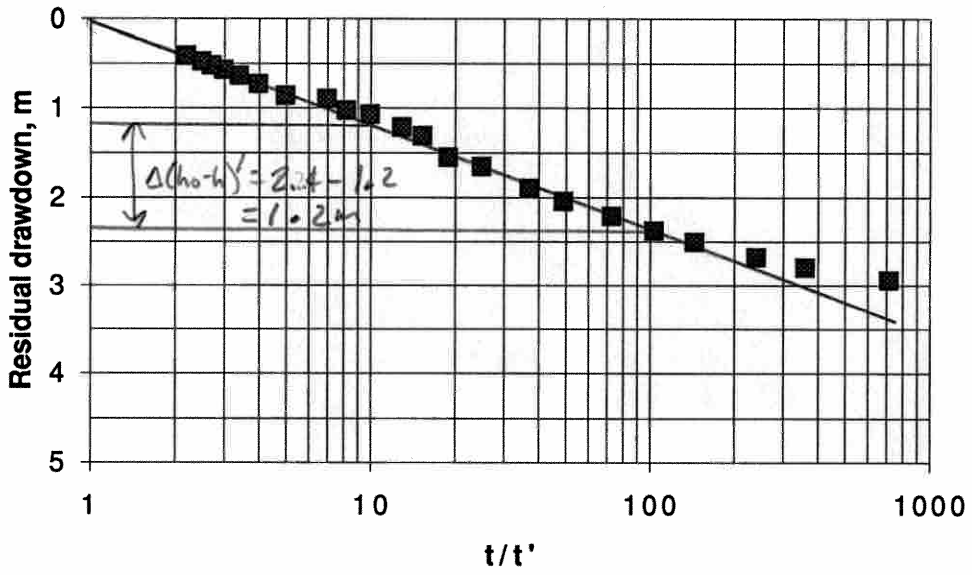
$T = \frac{2.3\,Q}{4\pi\,\Delta(h_o - h)'}$

$= \frac{2.30(1200\,m^3/d)}{4\pi(1.2\,m)}$

$T = 183\,m^2/d$

40

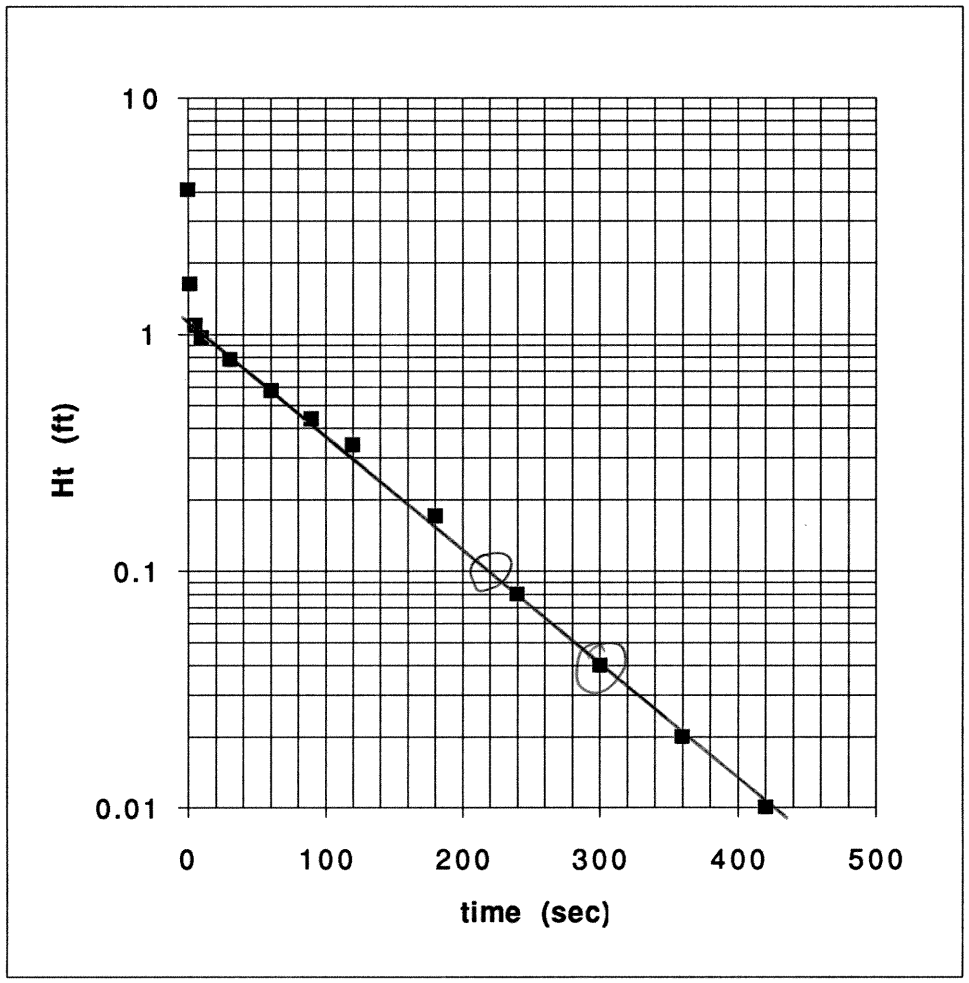
Problem 5



20 total

Homework 5 Problem 2
Bouwer and Rice Slug Test

Time (sec)	Ht (ft)
0.001	4.08
1	1.63
5	1.09
10	0.97
30	0.78
60	0.58
90	0.44
120	0.34
180	0.17
240	0.08
300	0.04
360	0.02
420	0.01



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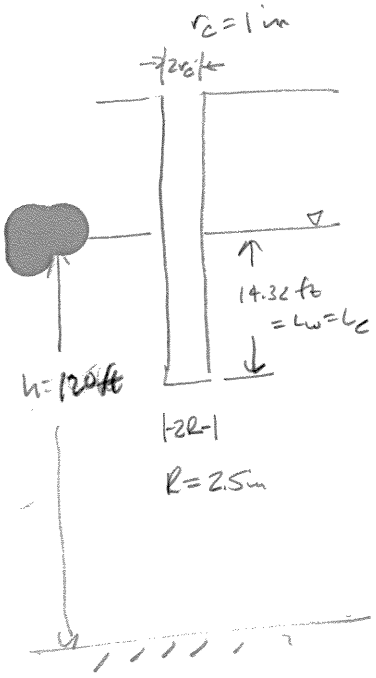


$$K = \frac{r_c^2 \ln \frac{L_e}{R}}{2L_e} \frac{1}{t} \ln \frac{H_0}{H_t}$$ 4

$L_w = 14.32\text{ ft} < h = 120\text{ ft}$

$$\ln \frac{R_e}{R} = \left[\frac{1.1}{\ln(L_w/R)} + \frac{A + B \ln\left[\frac{h - L_w}{R}\right]}{L_w/R}\right]^{-1}$$ 4

$$\frac{1}{t} \ln \frac{H_0}{H_t} = \frac{1}{t_2 - t_1} \ln \frac{H_1}{H_2}$$ 4

$H_1 = 0.10\text{ ft}$ $t_1 = 220\text{ sec}$

$H_2 = 0.04\text{ ft}$ $t_2 = 300\text{ sec}$

$$\frac{1}{t_2 - t_1} \ln \frac{H_1}{H_2} = \frac{1}{(300 - 220)} \ln \frac{0.10\text{ ft}}{0.04\text{ ft}}$$

$$= 0.012\ \text{sec}^{-1}$$

$$\frac{L_w}{R} = \frac{14.32\text{ ft}}{2.5\text{ in}\left(\frac{1\text{ ft}}{12\text{ in}}\right)} = 69 \Rightarrow \text{Fig 7.25} \quad A = 3.6 \quad B = 0.70$$

$$\ln \frac{R_e}{R} = \left[\frac{1.1}{\ln(69)} + \frac{3.6 + 0.70 \ln\left[\frac{120\text{ ft} - 14.32\text{ ft}}{(2.5/12)\text{ ft}}\right]}{69}\right]^{-1} = [0.26 + 0.172]^{-1} = 2.67$$

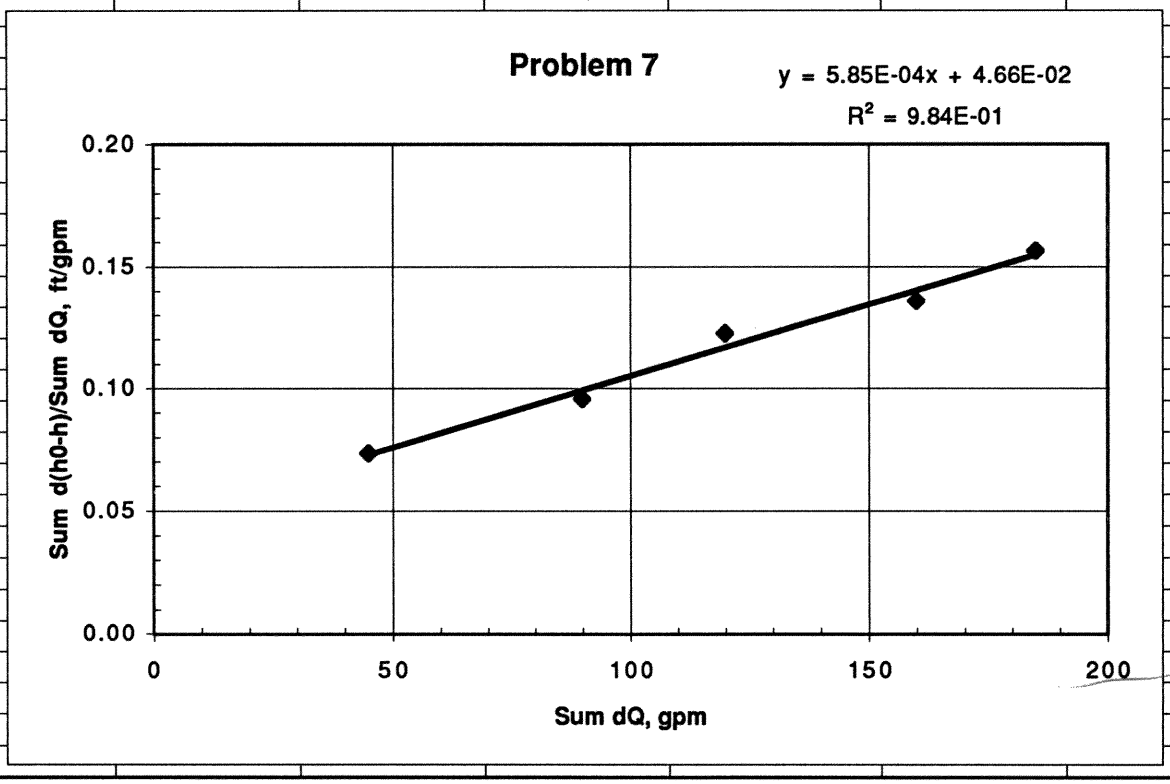
$$K = \frac{\left(\frac{1}{12}\text{ ft}\right)^2 (2.67)}{2(14.32\text{ ft})} (0.012\ \text{sec}^{-1}) = 7.8 \times 10^{-6}\ \frac{\text{ft}}{\text{sec}} \left(\frac{86400\text{ sec}}{\text{d}}\right)$$

$$K = 0.67\ \text{ft/d}$$ 4

Homework 4, Problem 7

Step-Drawdown Tests

delta(ho-h) (ft)	deltaQ (gpm)	Sum delta (ho-h)	Sum deltaQ	Sum delta(ho-h) Sum deltaQ
3.30	45	3.30	45	0.073
5.31	45	8.61	90	0.096
6.10	30	14.71	120	0.123
7.00	40	21.71	160	0.136
7.22	25	28.93	185	0.156



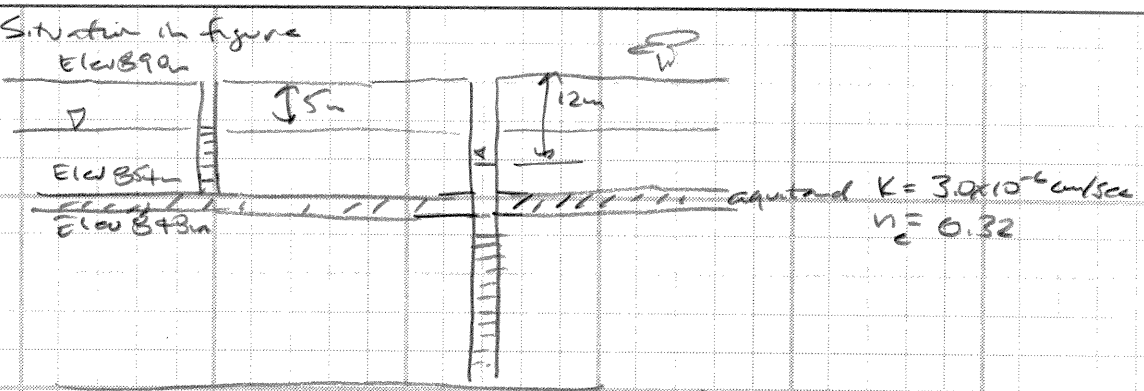
10 total

B = 0.0466 ft/gpm

C = 0.000585 ft/(gpm)²

4

Given: Situation in figure



Find: (a) Flow direction through aquitard, specific discharge in m/d
(b) Time of travel through aquitard

(a) Head in unconfined aquifer > head in confined aquifer

flow ↓

$$V = \frac{K\,dh}{l_e}$$

$$= (3.0\times10^{-6}\ cm/sec)\,\frac{[(890m-5m)-(890-12m)]}{854m-848m}$$

10

$$= (3.0\times10^{-6}\ cm/sec)\left(\frac{885m-879m}{6m}\right)$$

$$= 3.5\times10^{-6}\ cm/sec\left(\frac{1m}{100cm}\right)\left(\frac{86400sec}{d}\right)$$

$$\boxed{V = 3.0\times10^{-3}\ m/d}$$

(b) $$V_x = \frac{V}{n_e}$$

$$= \frac{3.0\times10^{-3}\ m/d}{0.32}$$

$$V_x = 9.5\times10^{-3}\ m/d$$

4

$$t = \frac{6m}{9.5\times10^{-3}\ m/d}$$

$$\boxed{t = 640\ d}$$