Complete problems 2, 4, 6, 10, 16

theoretical drawdown caused by the new well after 30 days of continuous pumping at the following distances: 50, 150, 250, 500, 1000, 3000, 6000, and 10,000 ft. (This problem and the following problem can readily be solved using Excel with the algorithm that is suggested in Analysis K. The repetitive nature of the calculations is especially suited to a spreadsheet solution.)

2. A well that is screened in a confined aquifer is to be pumped at a rate of 165,000 ft^3/day for 30 days. If the aquifer transmissivity is 5320 ft^2/day, and the storativity is 0.0007, what is the drawdown at distances of 50, 150, 250, 500, 1000, 3000, 5000, and 10,000 ft?
3. Plot the distance-drawdown data from Problem 1 on semilog paper (or on Excel).
4. If the pumping well from Problem 1 has a radius of 1 ft, and the observed drawdown in the pumping well is 87 ft, what is the efficiency of the well?
5. Plot the distance-drawdown data from Problem 2 on semilog paper (or on Excel).
6. If the pumping well has a radius of 1 ft, and the observed drawdown in the pumping well is 64 ft, what is the efficiency of the well?
7. If the aquifer in Problem 1 is not fully confined, but is overlain by a 13.7-ft-thick confining layer with a vertical hydraulic conductivity of 0.13 ft/day and no storativity, what would be the drawdown values after 30 days of pumping at 325 gal/min at the indicated distances?
8. If the aquifer described in Problem 2 is not fully confined, but is overlain by a 8.0-ft-thick leaky, confining layer with a vertical hydraulic conductivity of 0.034 ft^2/day, what would be the drawdown values after 30 days of pumping at 165,000 ft^3/day at the indicated distances?
9. With reference to the well and aquifer system in Problem 1, compute the drawdown at a distance of 250 ft at the following times: 1, 2, 5, 10, 15, 30, and 60 min; 2, 5, and 12 h; and 1, 5, 10, 20, and 30 days.
10. With reference to the well and aquifer system in Problem 8, compute the drawdown at a distance of 100 ft from the well at the following times: 1, 2, 5, 10, 15, 30, and 60 min; 2, 5, and 12 h; and 1, 5, 10, 20, and 30 days.
11. Plot the time-drawdown data from Problem 9 on semilog paper.
12. Plot the time-drawdown data from Problem 10 on semilog paper. How is this plot different from that of Problem 11?
13. A well that pumps at a constant rate of 78,000 ft^3/day has achieved equilibrium so that there is no change in the drawdown with time. (The cone of depression has expanded to include a recharge zone equal to the amount of water being pumped.) The well taps a confined aquifer that is 18 ft thick. An observation well 125 ft away has a head of 277 ft above sea level; another observation well 385 ft away has a head of 291 ft. Compute the value of aquifer transmissivity using the Theim equation.
14. A well that pumps at a constant rate of 78,000 ft^3/day has achieved equilibrium so that there is no change in the drawdown with time. (The cone of depression has expanded to include a recharge zone equal to the amount of water being pumped.) The well taps an unconfined aquifer that consists of sand overlying impermeable bedrock at an elevation of 260 ft above sea level. An observation well 125 ft away has a head of 277 ft above sea level; another observation well 385 ft away has a head of 291 ft. Compute the value of hydraulic conductivity using the Theim equation.
15. A slug test was performed on a monitoring well with a radius of 2 in. and a sand pack of radius 5 in. The aquifer thickness was 8 ft and the height of the water column in the casing was 51 ft. The following time/head data were obtained. Find the aquifer transmissivity if you assume a storativity of 0.001.

Time (s)	Head (ft)	Time (s)	Head (ft)
0	2.67	10	0.33
0.1	2.38	12	–0.60
0.2	2.13	14	–0.28
0.4	1.83	16	0.42
0.8	1.34	18	0.22
1.2	0.65	20	–0.30
1.6	–0.02	22	–0.20
2.0	–0.55	24	0.21
2.4	–0.96	26	0.16
2.8	–1.26	28	–0.15
3.2	–1.45	30	–0.14
3.6	–1.47	32	0.10
4.0	–1.36	34	0.10
4.4	–1.14	36	–0.08
4.8	–0.84	38	–0.09
5.2	–0.49	40	0.05
5.6	–0.12	42	0.07
6.0	0.23	44	–0.04
6.2	0.53	46	–0.05
6.6	0.75	48	0.02
8.0	0.89	60	0.01

16. The following data are from a pumping test where a well was pumped at a rate of 200 gal per minute. Drawdown as shown was measured in an observation well 250 ft away from the pumped well. The geologist's log of the well is as follows:

0–23 ft	Glacial till, brown, clayey
23–77 ft	Dolomite, fractured
77–182 ft	Shale, black, dense
182–217 ft	Sandstone, well-cemented, coarse
217–221 ft	Shale, gray, limy