

FACULTY NOTES

The LTAs and Spinoffs are designed so that each professor can implement them in a way that is consistent with his/her teaching style and course objectives. This may range from using the materials as out-of-class projects with minimal in-class guidance to doing most of the work in class. The LTAs and Spinoffs are amenable to small group cooperative work and typically benefit from the use of some learning technology. Since the objective of the LTAs and Spinoffs is to support the specific academic goals you have set for your students, the Faculty Notes are not intended to be prescriptive. The purpose of the Faculty Notes is to provide information that assists you to take full advantage of the LTAs and Spinoffs. This includes suggestions for instruction as well as answers for the exercises.



FACULTY NOTES

SPINOFF 5B

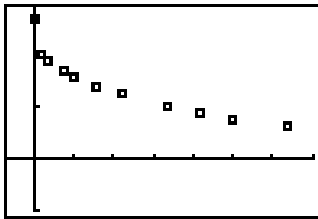
Slugging It Out

Answers

The following are answers for Exercises 1, 3, and 4 for each of the three wells. Student answers for Exercise 3 may differ from the one given depending on which data points are chosen. Answers for Exercise 2 are not included because each person will select by eye a slightly different estimate of the best-fitting line. The sample scatterplot and best-fit line were obtained using a TI-82™ calculator.

Well #1

1)

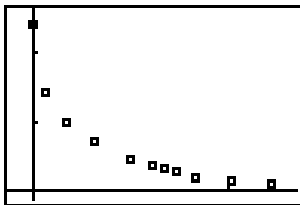


Data from well #1:

- 3) Line using points (0.2083, 2) and (5, 0.764): $D = -0.2579t + 2.054$, where D is displacement in feet and t is time in minutes.
- 4) Best fit line: $D = -0.262t + 2.036$, where D is displacement in feet and t is time in minutes.

Well #2

1)

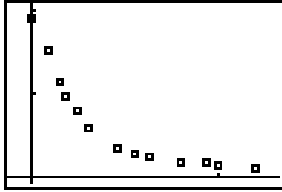


Data from well #2:

- 3) Line using points (0.065, 1.398) and (0.8317, 0.192): $D = -1.57t + 1.50$, where D is displacement in feet and t is time in minutes.
- 4) Best fit line: $D = -1.49t + 1.50$, where D is displacement in feet and t is time in minutes.

Well #3

1)



Data from well #3:

- 3) Line using points (0.1, 1.509) and (0.9333, 0.1967): $D = -1.57t + 1.67$, where D is displacement in feet and t is time in minutes.
- 4) Best fit line: $D = -1.70t + 1.43$, where D is displacement in feet and t is time in minutes.

Final analysis: The unit for the independent variable is minutes and the unit for the dependent variable is feet. The slope of the line represents how fast the displacement is changing. The units for the slope are feet per minute. The slope is an estimate of the permeability of the rock. A larger absolute value for slope would indicate that the water was seeping into the rock more quickly. Similarly, a slope with small absolute value would indicate slower seepage and less permeable rock. The rock surrounding well #3 seems to be the most permeable, whereas the rock around well #1 is the least permeable.