A	B	C	D	E
Problem 8		Estimating cost to build pool		
Key:				
L1	total length	ft		
L2	slope length	ft		
W	width	ft		
H1	total depth	ft		
H2	shallow depth	ft		
Soil density	0:good,1:bad	conditional		
restricted?	1:yes, 0:no	conditional		

	Cost to put in pool		
	pool 1	pool 2	pool 3
L1 (ft)			
L2 (ft)			
W (ft)			
H1 (ft)			
H2 (ft)			
Soil density			
restricted?			
Volume (ft^3)			
floor area (ft^2)			
Cost ($)			

Problem 8 spreadsheet

Plotting with Excel

9. Go to the appropriate website for your version of Excel and review the basics of graphing (often called charts or working with charts). Recreate the plot shown in Figure 8-13. Submit the resulting spreadsheet to your JagPal through the Sakai Dropbox before the next class.

10. Go to the appropriate website for your version of Excel and review the basics of graphing (often called charts or working with charts). Recreate the plot shown in your handout from class and submit the resulting spreadsheet to your JagPal through the Sakai Dropbox before the next class.

11. The voltage v (mV) of a signal as a function of time t (ms) is given by the equation

$$v = a\sin\frac{\pi t}{3} + b\sin\frac{2\pi t}{3} + c\sin\pi t$$

Show two curves for the voltage over the range of $t = 0$ to $t = 3$ s. For the first curve, let $a = 1.5$ mV, $b = 0.2$ mV and $c = 0.4$ mV. For the second curve, let $a = 1.3$ mV, $b = -0.3$ mV and $c = 0.1$ mV. Be sure to make the plot look professional.

12. The monthly repayment A on a loan of P is given by the formula

$$A = P\left[\frac{i}{1-(1+i)^{-n}}\right]$$

Plot A as a function of i, the monthly interest rate, using the range $0 \le i \le 0.02$. Show three different curves on the same axes for n=12, 36, and 60 months. The starting loan amount P is $5000. Make the plot look professional.

Current (A)	Battery 1 Voltage (V)	Battery 2 Voltage (V)
1.5	12.3	12.3
5.0	12.0	12.1
10	11.0	11.6
12	10.0	10.9
15	9.2	10.0
20	8.0	9.0
30	5.5	7.0

14. Two metal bars are tested with an axial load. Under the load, the bars are deformed and the stress, σ (MPa), can be measured as a function of the strain, ε (dimensionless). Plot the two stress-strain curves and add properly formatted logarithmic trendlines to the plot, including the equations. Remember to make the plot look professional.

ε	Sample 1	Sample 2
0.01	105.63	84.40
0.02	298.71	240.65
0.025	353.47	287.56
0.03	375.72	299.04
0.04	389.33	303.90
0.05	403.63	309.39
0.06	411.37	312.78
0.075	418.80	321.03
0.09	435.91	337.77
0.1	453.18	344.43
0.125	466.25	353.91
0.15	477.89	346.34
0.175	453.94	329.82
0.19	439.62	317.04

15. The resistances (Ω) of five different lengths and two different diameters of metallic electrical wire have been measured and are shown on the next page. Plot the resistances as a function of length and add the linear trendlines for each.

18. A company is evaluating where to place the front end of a pipe system to bring water from a mountain reservoir down to a power house. Two locations have been identified as likely vantage points. Five different diameter pipes are also be considered. The volume flowrate, Q, in m^3/s, for each pipe diameter has been estimated for both locations and are shown in the table below. Create a professional looking plot of the data and apply a polynomial trendline for each dataset. Include the equations for the trendlines. What level of polynomial gives the best fit?

Diameter, m	Q, m^3/s, point 1	Q, m^3/s, point 2
1	0.25	0.4
1.5	0.8	1.15
3	4.55	6
5	17.5	21
7.2	49	61

19. The theoretical power required for a high-speed passenger train at various speeds has been determined through the use of wind tunnel tests. Two different locations are proposed for the trains, with one train in mountainous region and the other train on the prairie (flat). More power will be necessary in the mountainous region. The results of the tests are shown in the table below. Create a professional looking plot of the data and find the power trendlines for each location. Include the equation. What power will be required for both scenarios for a velocity of 600 km/h?

V, m/s	Location 1	Location 2
40	156	145
100	1743	1436
140	4100	3500
160	5720	4235
200	10,760	6750
250	19,200	11,450
290	25,550	14,578

20. Four gold mines in a mountainous region have been in continuous operation for five years. The output is measured in tons, and it has been declining each year in each mine. The data are shown on the next page in the table. Plot the results and find the power trendlines with equations for each mine. Make the plot look professional, and be careful to enter the year data exactly as listed in the table. Estimate the output in each mine after ten years.