Objective

The purpose of this assignment is twofold: first, you will have an opportunity to practice your skills in developing a contour map from data recorded from a differential leveling survey, and second, you will get a chance to practice your skills in developing simple engineering spreadsheets for surveying applications.

Problems

Part 1. Table 1 lists the elevations (in feet) at the corners of each 50-ft square grid cells. Develop a contour map for the two left-most cells in the top row of the grid elevation data (indicated by green in Table 1). For these two cells, draw 2-ft interval contours using a scale of 1 inch = 25 feet. Remember to follow the **homework format**; however, you may use a different type and size of paper to present your contour map if you desire. Identify your solution methodology and discuss the strengths and weaknesses of your solution. If you have any questions, please contact **Dr. Camp**.
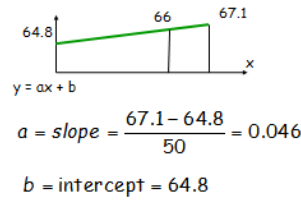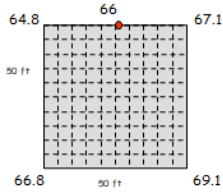
Table 1. Elevation data for 50' x 50' grid.

	A	B	C	D	E
1	64.8	67.1	69.3	71.2	67.4
2	66.8	69.1	70.9	71.5	69.2
3	67.2	70.7	71.1	72.8	69.7
4	63.3	66.5	68.1	68.2	66.6

Show all the details of your calculations for the two left-most cells in the top row of the grid above.
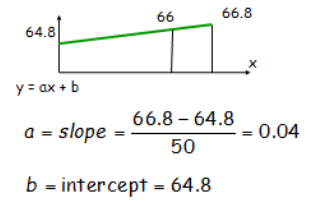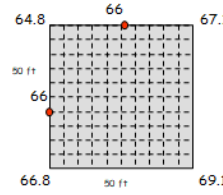
Topographic Survey – 1ˢᵗ cell
Construction of Contours – top edge

$$y = ax + b$$

$$a = slope = \frac{67.1 - 64.8}{50} = 0.046$$

$$b = intercept = 64.8$$

$$66 = 0.046x + 64.8 \qquad \boxed{x = 26.1'}$$

Topographic Survey – 1ˢᵗ cell
Construction of Contours – left edge

$$y = ax + b$$

$$a = slope = \frac{66.8 - 64.8}{50} = 0.04$$

$$b = intercept = 64.8$$

$$66 = 0.04x + 64.8 \qquad \boxed{x = 30'}$$

Topographic Survey – 1ˢᵗ cell
Construction of Contours – bottom edge

$$y = ax + b$$

$$a = slope = \frac{69.1 - 66.8}{50} = 0.046$$

$$b = intercept = 66.8$$
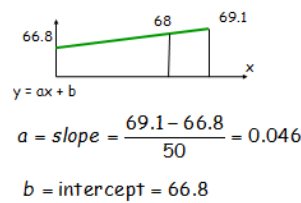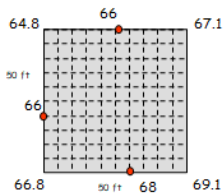
$$68 = 0.046x + 66.8 \qquad \boxed{x = 26.1'}$$

Topographic Survey – 1ˢᵗ cell
Construction of Contours – right edge

$$y = ax + b$$

$$a = slope = \frac{69.1 - 67.1}{50} = 0.04$$

$$b = intercept = 67.1$$
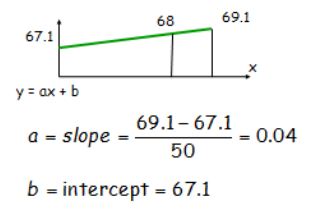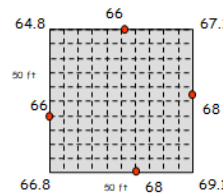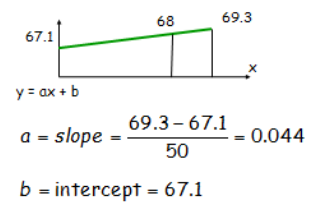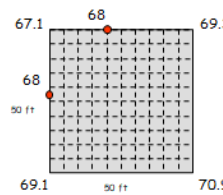
$$68 = 0.04x + 67.1 \qquad \boxed{x = 22.5'}$$

Topographic Survey – 1ˢᵗ cell
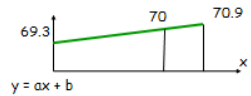### Construction of Contours – right edge

Topographic Survey – 2ⁿᵈ cell
Construction of Contours – top edge

$$y = ax + b$$

$$a = slope = \frac{69.3 - 67.1}{50} = 0.044$$
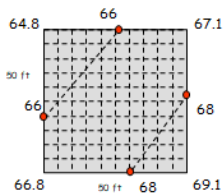
$$b = intercept = 67.1$$

$$68 = 0.044x + 67.1 \qquad \boxed{x = 20.5'}$$

Topographic Survey – 2nd cell

Construction of Contours – right edge

67.1   68   69.3

68   70

50 ft

69.1   50 ft   70.9

69.3   70   70.9

$y = ax + b$
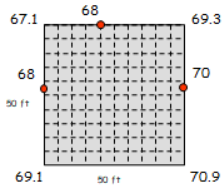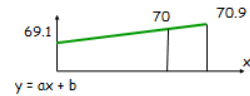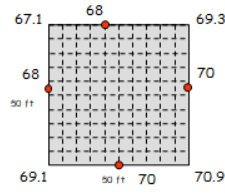
$a = slope = \dfrac{70.9 - 69.3}{50} = 0.032$

$b = intercept = 69.3$

$70 = 0.032x + 69.3$ $\boxed{x = 21.9'}$

Topographic Survey – 2nd cell
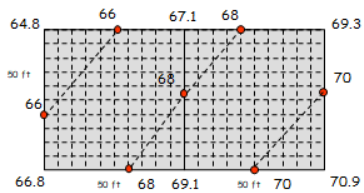
Construction of Contours – bottom edge

67.1   68   69.3

68   70

50 ft

69.1   50 ft 70   70.9

69.1   70   70.9

$y = ax + b$

$a = slope = \dfrac{70.9 - 69.1}{50} = 0.036$

$b = intercept = 69.1$

$70 = 0.036x + 69.1$ $\boxed{x = 25'}$

Topographic Survey

Construction of Contours

64.8   66   67.1   68   69.3

50 ft   68   70

66

66.8   50 ft   68   69.1   50 ft   70   70.9

Part 2. Use the graphing capabilities of Excel to develop a contour map from the data listed in Part 1. Include a North arrow and contour line labels on your plot. Upload a copy of your Excel spreadsheet to the HWK #3 dropbox in eCourseware.