Landsat images are in the form of arrays of numbers; one array for each band. These numbers give the reflected energy from the surface in the different bands.

The arrays of numbers on the left are the pixel values from a small area in the city of Oakland, California.

**Problem 1** – If the resolution is 30 meters/pixel, what are the dimensions of this area of the city in A) meters? B) feet? (if 1 meter = 3 feet).

**Problem 2** – Graph the spectra of each of the 9 pixels in this image.

**Problem 3** – From the calibration spectra, draw a similar-sized grid and label each pixel with its thematic content (i.e. R=rock; w = water; b = buildings; P=plants/forest)

**Problem 4** – Select colors for each of the thematic types and ‘colorize’ your image to make a false-color picture of this area.

**Problem 5** – What do you think this area would look like if you could view it at ground level?

**Problem 1** – What are the dimensions of this area of the city in A) meters? B) feet?
Answer: A) 3x3 pixels @ 30-meters/pixel is **90 meters x 90 meters**. B) **270 feet x 270 feet**.

**Problem 2** – Graph the spectra of each of the 9 pixels in this image. Answer: The spectra form three distinct groups:

<table>
<thead>
<tr>
<th>Pixel 1-3</th>
<th>Pixel 4-6</th>
<th>Pixel 7-9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trees</td>
<td>Rock</td>
<td>Water</td>
</tr>
</tbody>
</table>

**Problem 3** – From the calibration spectra, draw a similar-sized grid and label each pixel with its thematic content (i.e. R=rock; w = water; b = buildings; P=plants/forest)
Answer: **Pixels 1-3 in top row are trees or plants; Pixels 4-6 in middle row are rocky or exposed ground; Pixel 7-9 is water.**

<table>
<thead>
<tr>
<th>T</th>
<th>T</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>W</td>
<td>W</td>
<td>W</td>
</tr>
</tbody>
</table>

**Problem 4** – Select colors for each of the thematic types and ‘colorize’ your image to make a false-color picture of this area. Answer:

```
   T | T | T |
---|---|---|
   R | R | R |
---|---|---|
   W | W | W |
```

**Problem 5** – What do you think this area would look like if you could views it at ground level?
Answer: **This 90m x 90m area borders an area containing water such as a lake, river or creek. The green area is the trees/grass or plant matter bordering a narrow beach-like area.**