

Tables of Values

1. Consider the following table of values.

| | | | | | |
|---|---|---|---|-----|---|
| 0 | 1 | 2 | 3 | ... | 9 |
| 9 | 0 | 1 | 2 | ... | 8 |
| 8 | 9 | 0 | 1 | ... | 7 |
| ⋮ | | | | | ⋮ |
| 1 | 2 | 3 | 4 | ... | 0 |

You will choose 10 entries from the table from different rows and different columns. That is, pick only one number from each row and column.

- (a) Is it possible to choose the same number 10 times? Explain.
- (b) Is it possible to have the same number repeated 9 times? 8 times? Explain.
- (c) Is it possible for each number to be chosen only once? That is, there are no repeated numbers in your list. Explain.
- (d) What is the possible range for the sum of your digits?

2. Now consider the following table.

| | | | | |
|----|----|----|----|---|
| 19 | 8 | 11 | 25 | 7 |
| 12 | 1 | 4 | 18 | 0 |
| 16 | 5 | 8 | 22 | 4 |
| 21 | 10 | 13 | 27 | 9 |
| 14 | 3 | 6 | 20 | 2 |

Again you will choose 5 entries from the table from different rows and columns.

- (a) Do you notice any pattern in your choices? (*You will probably have to repeat the selection several times before you notice the pattern.*)
- (b) Carefully study the entries in the table to determine how it was built.
Hint: You could look at the first row as:

| | | | | |
|--------|-------|-------|--------|-------|
| $7+12$ | $7+1$ | $7+4$ | $7+18$ | $7+0$ |
| 12 | 1 | 4 | 18 | 0 |
| 16 | 5 | 8 | 22 | 4 |
| 21 | 10 | 13 | 27 | 9 |
| 14 | 3 | 6 | 20 | 2 |

- (c) Build your own table of values that will yield a similar result.
- (d) What pattern do you notice in the numbers used to build your table?