1.NBT Number Square

Alignments to Content Standards: 1.NBT.C.5

Task

Part 1

The teacher explains the Number Square:

- In this big number square, the numbers in the little individual boxes get bigger by one as we travel to the right.
- When we get to the end of a row, the next number is found at the start of the line below.
  - Notice how the numbers get smaller by one as we travel to the left.
- When we get to the beginning of a row, the previous number is found at the end of the line above.
  - The first number on this number square is 1 and the last number is 100.
Class discussion (think and share) and/or individual work (e.g. on white boards) given orally by the teacher:

a. What number is to the right of 78? How does that number compare to 78?

b. What number is three to the right of 34? How does that number compare to 34?

c. What number is five to the left of 18? How does that number compare to 18?

d. Start at 13 and move 11 steps forward (starting to the right) on the number square; where do we end up? What did we have to do after seven steps?
Part 2

If need be, the teacher can review the basics of the 1-100 Number Square. Class discussion and/or individual work proceeds through the following types of questions.

a. Find the number $12 - 5$ by starting at 12 on the number square and counting back 5 steps, moving to the left and going up to the previous row as needed.

b. Find the sum $37 + 10$ by starting at 37 on the number square and counting forward 10 spaces, moving to the right and going down to the next row as needed.

c. Find the difference $37 - 10$ by starting at 37 on the number square and counting back 10 spaces, moving to the left and going up to the previous row as needed.

Part 3

If needed, the teacher can review basic adding and subtracting on the 1-100 Number Square. Class discussion and/or individual work proceeds through the following types of questions.

a. Find the following sums using the number square:

- $2 + 10$
- $19 + 10$
- $20 + 10$
- $74 + 10$
- $88 + 10$

b. Where on the number square is the result of adding ten to a number? Use your answers above to help you.

c. What happens when we add ten to a number? How would you explain what is happening?

d. Find the following differences using the number square.

- $13 - 10$
- $39 - 10$
- $40 - 10$
- $65 - 10$
e. Where on the number square is the result of subtracting ten from a number? Use your answers above to help you.

f. What happens when we subtract ten from a number? How would you explain what is happening?

**Extension**

a. Find the following sums without any tools (pencil and paper, blocks, or the number square). Use the number square to check your work.

- $38 + 10$
- $23 + 10$
- $51 + 10$
- $77 + 10$
- $5 + 10$

b. Find the following differences without any tools (pencil and paper, blocks, or the number square). Use the number square to check your work.

- $45 - 10$
- $31 - 10$
- $60 - 10$
- $78 - 10$
- $12 - 10$

**IM Commentary**

This task describes an extended instructional sequence whose purpose is to use the 1-100 number square (also called a hundreds chart) to support understanding of adding and subtracting ten from a two-digit number. The key conceptual point, that the digit in the tens place is increases or decreases by 1, is connected with the process of counting, arranged in a way that reinforces place value. In evaluating the sum of a number and ten by counting ten spaces to the right, the student will see that in adding a ten they always move to the next row. In their final observation, they should notice that the result has one additional ten and the same number of ones. This is particularly
useful for the student in understanding in the cases of adding ten to a single-digit number, adding ten to ninety, or subtracting ten from a number in the range $[11, 19]$.

This reasoning can build on more concrete place-value models. For example, students could use number disks or base-ten blocks to help explain why adding ten increases the tens digit by one. Teachers could move this discussion along through scaffolding questions, such as, "How many tens and how many ones are in 37, the number we started at? And how many tens and how many ones are in 47, the number we ended up at?"

The materials for this task could be one large hundred square that the class uses together, or students could each be given lap/paper sized number square to follow along individually. This sequence could be taught in one day, or the parts could be broken up over several days. If the teacher breaks up the parts across several days s/he should make sure to review the big idea from the previous days so that students can see the connection between counting on by 10 ones and counting on by 1 ten.

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Solution

Part 1

a. 79 is to the right of 78. 79 is one more than 78, or $79 = 78 + 1$.

b. 37 is three to the right of 34. 37 is three more than 34, or $37 = 34 + 3$.

c. 13 is five to the left of 18. 13 is five less than 18, or $13 = 18 - 5$.

d. We end up at 24. We had to go down to the next row once we passed 20.

Part 2

a. We end up at 7, as $12 - 5 = 7$.

b. $37 + 10 = 47$

c. $37 - 10 = 27$

Part 3
a. Find the following sums using the number square:

- $2 + 10 = 12$
- $19 + 10 = 29$
- $20 + 10 = 30$
- $74 + 10 = 84$
- $88 + 10 = 98$

b. On this number square, the result of adding ten to a number is directly below that number.

c. Adding ten to a number increases the digit in the tens place by one. This is because the digit in the tens place of a number represents how many tens are in that number. Adding a ten increases the amount of tens by one. (First graders might use a concrete model, such as base-ten blocks or number disks, to give this reasoning.)

d. Find the following differences using the number square:

- $13 - 10 = 3$
- $39 - 10 = 29$
- $40 - 10 = 30$
- $65 - 10 = 55$
- $92 - 10 = 82$

e. On this number square, the result of subtracting ten from a number is directly above that number.

f. Subtracting ten from a number decreases the digit in the tens place by one. This is because the digit in the tens place of a number represents how many tens are in that number. Subtracting a ten decreases the amount of tens by one. (First graders might use a concrete model, such as base-ten blocks or number disks, to give this reasoning.)

Extension

a. Find the following sums in your head, without counting on the number square:

- $38 + 10 = 48$
- $23 + 10 = 33$
- $51 + 10 = 61$
- $77 + 10 = 87$
b. Find the following differences in your head, without counting on the number square:

- $45 - 10 = 35$
- $31 - 10 = 21$
- $60 - 10 = 50$
- $78 - 10 = 68$
- $12 - 10 = 2$