

Developing Number Sense with a 0-99 Chart

How many units can fit in the ones place? The answer is nine, of course. This principal (which is crucial to the development of good number sense) is poorly modeled by typical one through one hundred charts, base ten manipulatives, and even finger counting. Think about it, when counting on fingers, most people can reach ten, not nine, before having to move to the next group of numbers. We have no "zero" finger, "zero" block, or "zero" space on our typical number charts. This throws the entire correspondence to our base ten number system off!

For this reason, it may be beneficial for young students to use a zero through ninety-nine chart to practice addition and subtraction. We have provide such a chart on the next page. We have also provided several addition and subtraction "tips" below that students, working in pairs or groups, can discover on their own or with a little help. Start by using an enlarged version (or overhead projection) of the chart to model several addition and subtraction problems with your students. Then, ask if anyone can think of a shortcut or rule for using the chart to add ten to any number less than 90 on the chart. Can anyone think of a rule for adding ten without using the chart? Can you think of a rule for subtracting ten? Now you can ask the students to come up with rules for adding and subtracting nine, eight, seven, etc.

The addition and subtraction tips, which your students should model on the zero through ninety-nine chart, actually reflect basic mathematical principles (substitution, for example: if $a = b - c$, then $d + a = d + b - c$). "Seeing" how these tips work can subtly help your students develop better number sense and a stronger grasp of the base ten number system.

Addition and Subtraction Tips

- 1) Adding or subtracting ten or any multiple of ten: Change the tens digit, but don't change the ones digit.
- 2) Adding nine: Add ten; then, subtract one from the ones digit.
Subtracting nine: Subtract ten; then, add one to the ones digit.
- 3) Adding eight: Add ten; then, subtract two from the ones digit.
Subtracting eight: Subtract ten; then, add two to the ones digit.
- 4) Adding seven: Add ten; then, subtract three from the ones digit.
Subtracting seven: Subtract ten; then, add three to the ones digit.
- 5) Adding six: Add ten; then, subtract four from the ones digit.
Subtracting six: Subtract ten; then, add four to the ones digit.
- 6) Adding nineteen: Add twenty; then, subtract one from the ones digit.
Subtracting nineteen: Subtract twenty; then, add one to the ones digit.
- 7) Adding eighteen: Add twenty; then, subtract two from the ones digit.
Subtracting eighteen: Subtract twenty; then, add two to the ones digit.
- 8) Adding seventeen: Add twenty; then, subtract three from the ones digit.
Subtracting seventeen: Subtract twenty; then, add three to the ones digit.
- 9) Adding sixteen: Add twenty; then, subtract four from the ones digit.
Subtracting sixteen: Subtract twenty; then, add four to the ones digit.

ZERO TO NINETY-NINE CHART

0	1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29
30	31	32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47	48	49
50	51	52	53	54	55	56	57	58	59
60	61	62	63	64	65	66	67	68	69
70	71	72	73	74	75	76	77	78	79
80	81	82	83	84	85	86	87	88	89
90	91	92	93	94	95	96	97	98	99



The riddle below has me stumped!
Please help me solve it. Use the Zero to Ninety-nine chart and the shortcuts you've discovered to solve the problems below. Then, match each number at the bottom of this page with one of your answers. Write the letter of the problem that gave you the answer above each line with the matching number. The first one has been done for you.

Why did the vampire attack a kindergartner?

A)
$$\begin{array}{r} 12 \\ + 8 \\ \hline 20 \end{array}$$

B)
$$\begin{array}{r} 17 \\ + 6 \\ \hline \end{array}$$

C)
$$\begin{array}{r} 25 \\ + 9 \\ \hline \end{array}$$

D)
$$\begin{array}{r} 38 \\ + 7 \\ \hline \end{array}$$

E)
$$\begin{array}{r} 23 \\ - 7 \\ \hline \end{array}$$

F)
$$\begin{array}{r} 36 \\ - 8 \\ \hline \end{array}$$

G)
$$\begin{array}{r} 45 \\ - 9 \\ \hline \end{array}$$

H)
$$\begin{array}{r} 52 \\ - 6 \\ \hline \end{array}$$

I)
$$\begin{array}{r} 57 \\ + 9 \\ \hline \end{array}$$

J)
$$\begin{array}{r} 62 \\ - 7 \\ \hline \end{array}$$

K)
$$\begin{array}{r} 35 \\ + 6 \\ \hline \end{array}$$

L)
$$\begin{array}{r} 71 \\ - 8 \\ \hline \end{array}$$

M)
$$\begin{array}{r} 98 \\ - 7 \\ \hline \end{array}$$

N)
$$\begin{array}{r} 58 \\ + 9 \\ \hline \end{array}$$

O)
$$\begin{array}{r} 60 \\ - 8 \\ \hline \end{array}$$

P)
$$\begin{array}{r} 75 \\ + 6 \\ \hline \end{array}$$

Q)
$$\begin{array}{r} 64 \\ + 9 \\ \hline \end{array}$$

R)
$$\begin{array}{r} 84 \\ - 6 \\ \hline \end{array}$$

S)
$$\begin{array}{r} 87 \\ + 8 \\ \hline \end{array}$$

T)
$$\begin{array}{r} 97 \\ - 9 \\ \hline \end{array}$$

U)
$$\begin{array}{r} 46 \\ + 7 \\ \hline \end{array}$$

V)
$$\begin{array}{r} 93 \\ - 6 \\ \hline \end{array}$$

W)
$$\begin{array}{r} 85 \\ + 8 \\ \hline \end{array}$$

X)
$$\begin{array}{r} 74 \\ + 8 \\ \hline \end{array}$$

$\frac{\quad}{46}$ $\frac{\quad}{16}$ $\frac{\quad}{93}$ $\frac{A}{20}$ $\frac{\quad}{95}$ $\frac{\quad}{52}$ $\frac{\quad}{67}$ $\frac{A}{20}$ $\frac{\quad}{45}$ $\frac{\quad}{66}$ $\frac{\quad}{16}$ $\frac{\quad}{88}$!



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Please help me solve it. Use the Zero to Ninety-nine chart and the shortcuts you've discovered to solve the problems below. Then, match each number at the bottom of this page with one of your answers. Write the letter of the problem that gave you the answer above each line with the matching number. The first one has been done for you.

Why did the boy rub a piece of toast on his foot?

A)
$$\begin{array}{r} 12 \\ + 8 \\ \hline 20 \end{array}$$

B)
$$\begin{array}{r} 17 \\ + 6 \\ \hline \end{array}$$

C)
$$\begin{array}{r} 25 \\ + 9 \\ \hline \end{array}$$

D)
$$\begin{array}{r} 38 \\ + 7 \\ \hline \end{array}$$

E)
$$\begin{array}{r} 43 \\ - 7 \\ \hline \end{array}$$

F)
$$\begin{array}{r} 66 \\ - 8 \\ \hline \end{array}$$

G)
$$\begin{array}{r} 55 \\ - 9 \\ \hline \end{array}$$

H)
$$\begin{array}{r} 72 \\ - 6 \\ \hline \end{array}$$

I)
$$\begin{array}{r} 87 \\ + 9 \\ \hline \end{array}$$

J)
$$\begin{array}{r} 92 \\ - 7 \\ \hline \end{array}$$

K)
$$\begin{array}{r} 35 \\ + 16 \\ \hline \end{array}$$

L)
$$\begin{array}{r} 21 \\ - 18 \\ \hline \end{array}$$

M)
$$\begin{array}{r} 48 \\ - 17 \\ \hline \end{array}$$

N)
$$\begin{array}{r} 58 \\ + 19 \\ \hline \end{array}$$

O)
$$\begin{array}{r} 60 \\ - 18 \\ \hline \end{array}$$

P)
$$\begin{array}{r} 75 \\ + 16 \\ \hline \end{array}$$

Q)
$$\begin{array}{r} 64 \\ + 19 \\ \hline \end{array}$$

R)
$$\begin{array}{r} 84 \\ - 16 \\ \hline \end{array}$$

S)
$$\begin{array}{r} 74 \\ + 18 \\ \hline \end{array}$$

T)
$$\begin{array}{r} 97 \\ - 19 \\ \hline \end{array}$$

$\frac{\quad}{66}$ $\frac{\quad}{36}$ $\frac{\quad}{85}$ $\frac{A}{20}$ $\frac{\quad}{31}$ $\frac{\quad}{31}$ $\frac{\quad}{36}$ $\frac{\quad}{45}$ $\frac{\quad}{66}$ $\frac{\quad}{96}$ $\frac{\quad}{92}$ $\frac{\quad}{78}$ $\frac{\quad}{42}$ $\frac{\quad}{36}!$