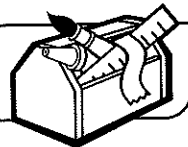


PROJECT
4
Computation Trick #1—Super Speedy Addition


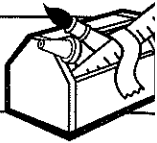
Set the Stage: Tell a friend that you have become a whiz at addition. To prove it, you are going to add five 3-digit numbers in your head within seconds.

Props Needed: calculator

Performing the Trick:
Examples:

	Trial 1	Trial 2	Trial 3
1. Ask your friend to jot down a 3-digit number on a piece of paper. Each digit must be different.	493	261	682
2. Ask your friend to write another 3-digit number below the first number. Each digit must be different.	764	503	149
3. One more time. (This is the “notice-me number.”)	175	935	306
4. Now it is your turn. Write a number so that the sum of your number and the first number is 999. (For example, in Trial 1, $493 + 506 = 999$.)	506	738	317
5. Write another number so that the sum of this number and the second number is 999. (For example, in Trial 1, $764 + 235 = 999$.)	<u>+ 235</u>	<u>+ 496</u>	<u>+ 850</u>
6. Pause a few seconds, and then give the sum of the five numbers. Have your friend check your super speedy addition on a calculator.	2,173	2,933	2,304

Figure out how to do this trick. How does it work?

PROJECT
4
Computation Trick #2—Subtraction Surprise


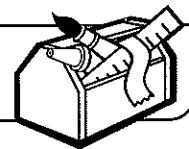
Set the Stage: Tell a friend that your subtraction skills have soared. You are now able to give the answer to a subtraction problem without ever seeing the problem.

Props Needed: calculator

Performing the Trick:
Examples:

- | | Trial 1 | Trial 2 |
|--|---|---|
| 1. Ask your friend to secretly write a 3-digit number on a piece of paper. Each digit must be different. | 135 | 562 |
| 2. Tell your friend to reverse the digits and write the new number below the first number. | 531 | 265 |
| 3. Now have your friend use a calculator to subtract the smaller number from the larger number. | $\begin{array}{r} 531 \\ - 135 \\ \hline 396 \end{array}$ | $\begin{array}{r} 562 \\ - 265 \\ \hline 297 \end{array}$ |
| 4. Say: <i>Tell me either the digit in the hundreds place or the digit in the ones place.</i> | 3 in the
hundreds place | 7 in the
ones place |
| 5. Pause a few seconds, and then give the answer. | 396 | 297 |

Figure out how to do this trick. How does it work?

**PROJECT
4****Computation Trick #3—Crazy Calendar Addition**

Set the Stage: Tell a friend that you have become so good at addition that you can tell what an addition problem is by merely looking at the answer.

Props Needed: calculator and a calendar

Performing the Trick:

Give your friend a calendar.

1. Ask your friend to choose a month and to secretly circle any three dates that are next to each other, either in a row or in a column.

Examples:

Sun.	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.
		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		

Trial 1**Trial 2****Trial 3**

2. Now ask your friend to add the three dates on a calculator and to give you the calculator showing the sum in the display.

30

27

39

3. Ask: *Are the three dates you circled in a row or in a column?*

column

row

column

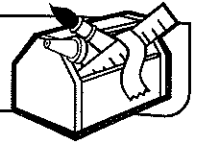
4. Pause a few seconds, and then give the answer.

3, 10, 17

8, 9, 10

6, 13, 20

Figure out how to do this trick. How does it work?

**PROJECT
4****12-Month Calendar**

JANUARY						
S	M	T	W	T	F	S
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				

FEBRUARY						
S	M	T	W	T	F	S
			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				

MARCH						
S	M	T	W	T	F	S
			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	

APRIL						
S	M	T	W	T	F	S
						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						

MAY						
S	M	T	W	T	F	S
	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			

JUNE						
S	M	T	W	T	F	S
				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	

JULY						
S	M	T	W	T	F	S
						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					

AUGUST						
S	M	T	W	T	F	S
		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		

SEPTEMBER						
S	M	T	W	T	F	S
					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

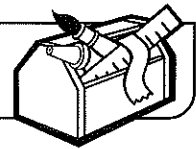
OCTOBER						
S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

NOVEMBER						
S	M	T	W	T	F	S
			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		

DECEMBER						
S	M	T	W	T	F	S
					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						

PROJECT
4

Computation Trick #1—Super Speedy Addition



Why Does It Work?

All you need to do to solve this addition problem is to look at the notice-me number. Here is why:

Remember that you created two pairs of numbers—each with a sum of 999. These two pairs of numbers add up to 1,998 ($999 + 999 = 1,998$). This is 2 short of 2,000. The remaining number is the notice-me number. If you subtract 2 from the notice-me number and add the result to 2,000, you will always get the answer!

The total will always be:

$$\begin{array}{r} (\text{notice-me number} - 2) \\ + 2,000 \\ \hline \end{array}$$

Example:

$$\begin{array}{r} 493 \\ 764 \\ \mathbf{175} \\ 506 \\ + 235 \\ \hline 2,173 \end{array} \quad (175 - 2) + 2,000$$

If you want to do more:

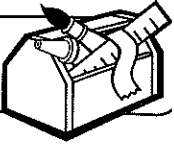
Here are some variations you might want to try. You might use 7 or 9 numbers instead of 5. The trick is done in exactly the same way. However, think about how your formula would change if you did this.

You might also try this with 6-digit numbers. Once again, the procedure is the same, but the formula would change.

Record your findings below.

PROJECT

4

Computation Trick #2—Subtraction Surprise**Why Does It Work?**

The trick depends on the way in which you had your classmate create the subtraction problem. There are only 9 possible solutions to a subtraction problem created in that way:

99 198 297 396 495 594 693 792 891

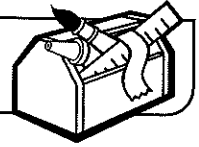
You might have noticed that the digit in the tens place is always 9 and that the digits in the hundreds place and the ones place always add up to 9.

For example, if your classmate tells you that the digit in the hundreds place is 4, then you know that the digit in the ones place must be 5, since $4 + 5 = 9$. You know that the digit in the tens place is always 9. Therefore the answer is 495.

What is the answer if your classmate tells you that the digit in the ones place is 9? _____

If you want to do more:

Will this trick work with a 4-digit number? With a 5-digit number?
Describe your findings.

**PROJECT
4****Computation Trick #3—Crazy Calendar Addition****Why Does It Work?**

If three numbers are evenly spaced, you can find the middle number by dividing the sum of the numbers by 3.

Example:

Sun.	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.
		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		

The numbers in a row and the numbers in a column of a calendar are evenly spaced.

- ◆ The numbers in a row are consecutive whole numbers. They are 1 apart.
- ◆ The numbers in a column are 7 apart. This is because there are 7 days in a week.

After you find the middle number by dividing the sum of the numbers by 3, it is easy to find the other two numbers.

- ◆ If the three numbers are in a row, subtract 1 from the middle number to get the first number. Add 1 to the middle number to get the third number.
- ◆ If the three numbers are in a column, subtract 7 from the middle number to get the first number. Add 7 to the middle number to get the third number.

If you want to do more:

What would happen if the three dates chosen were on a diagonal?
Would the trick still work? Why or why not?
