TEN TIMES

➡ Choose a number at random. **4 751**

The number can be made up of any number of digits. Digits may be repeated.
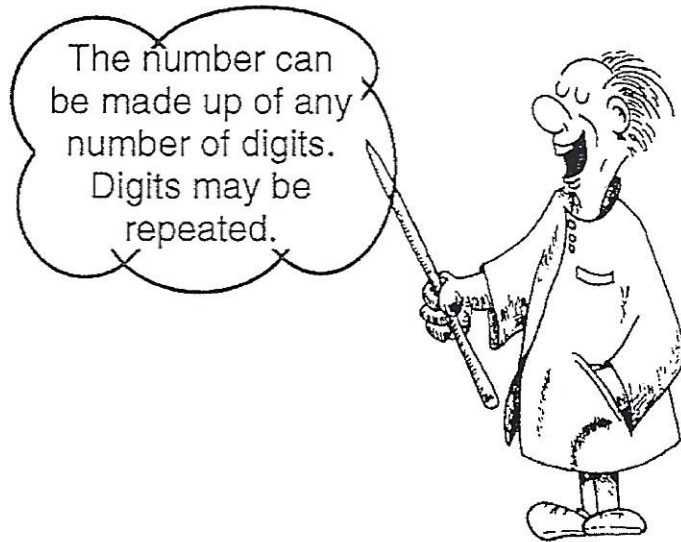
➡ Multiply by **10.** **47 510**

➡ Subtract your original number from your new number.

$$47\ 510$$
$$-\ 4\ 751$$
$$=\ 42\ 759$$

➡ Divide this answer by your original number.

$$42\ 759 \div 4\ 751 = ?$$

➡ Try again using some different starting numbers.

➡ Try some single digit, two digit, three digit and four digit numbers.

➡ Write about what you notice.

➡ Try to explain why it happens.

ROLE REVERSAL

➠ Choose any two digit numbers where no digit is repeated.

e.g. 63
36

➠ Reverse the digits.

➠ Subtract the smaller number from the larger number.

63
− 36
= 27

➠ Repeat the process using the new number that is formed.

72
− 27
= 45

➠ Continue until you reach a single digit answer.

54
− 45
= ?

Try these:

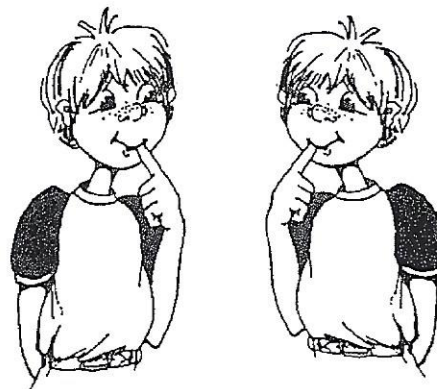|		
65 (1 step)	71 (2 steps)	93 (2 steps)
74 (3 steps)	26 (4 steps)	57 (5 steps)

What answer do you always reach?

Try to find a pattern to determine whether a starting number will only take one step to reach an answer.

DOUBLE UP

➠ Enter a 3 digit number into your calculator.   **e.g. 267**

➠ Multiply by **7.**   **1 869**

➠ Multiply by **11.**   **20 559**

➠ Multiply by **13.**   **???**

What happened? Discuss with your neighbour.

Try using some other 3 digit numbers.

Try using 3 digit numbers where all the digits are the same

   e.g. 222, 555, 888.

Try using numbers with trailing zeros.

   e.g. 100, 400, 700.
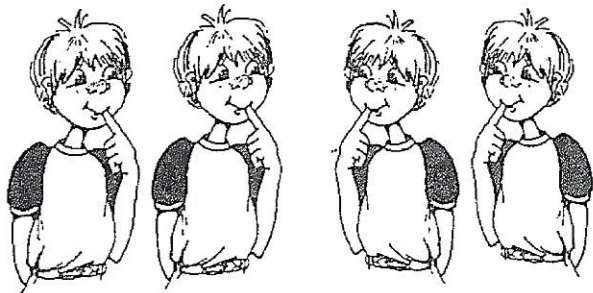
Write about what you notice.

Does the order in which you multiply matter?

Try multiplying by 13, then 11 and then 7.

What happens?

Try using a different order.

Try to explain why it happens.

DOUBLE TROUBLE

- Write down any three different single digit numbers.   **e.g. 3, 4, 7**

- Use these three numbers to make nine 2 digit numbers. Digits may be repeated.

  33, 44, 77
  34, 43, 73
  37, 47, 74

- Add the nine 2 digit numbers.

  33 + 44 + 77 + 34 + 43 + 73 + 37 + 47 + 74 = 462

- Add the original three numbers   **3 + 4 + 7 = 14**

- Divide the larger number by the smaller number.

  462 ÷ 14

- Write down your answer.

- Try this again using three different single digit numbers.

- Try starting with three odd numbers and then three even numbers.
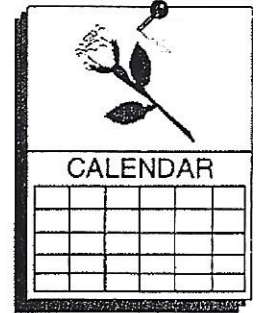
- Discuss with your neighbour.

- Try using consecutive single digit numbers.

  1, 2, 3   2, 3, 4   3, 4, 5   4, 5, 6
  5, 6, 7   6, 7, 8   7, 8, 9

Write about what you notice.

WHAT DAY WAS IT?

Judy was born on January 17th, 1981.
Which day of the week was that?

➡ To determine the day of the week on which you were born use the following steps.

➡ Write down the last two digits of the year in which you were born. **81**

➡ Divide this number by 4. Don't worry about any remainders. **20**

➡ Find the number for the month in which you were born from the table below. **January = 1**

➡ Write down the date in the month when you were born. **17**

➡ Add all the numbers from the previous steps **81 + 20 + 1 + 17 = 119**

➡ Divide this sum by 7 and note the remainder. **119 ÷ 7 = 17 r 0**

➡ Find the remainder in the table below to determine the day on which you were born.

MONTHS	
January	1
January (leap year)	0
February	4
February (leap year)	3
March	4
April	0
May	2
June	5
July	0
August	3
September	6
October	1
November	4
December	6

Remainder	Day
1	Sunday
2	Monday
3	Tuesday
4	Wednesday
5	Thursday
6	Friday
0	Saturday

I was born on a Saturday

COOL CALENDAR
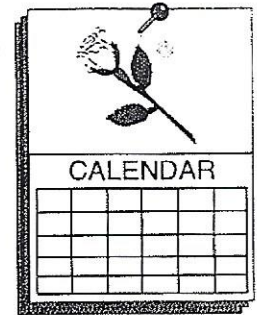
➡ Choose any month from the calendar.

➡ Find four dates that form a 2 x 2 pattern.

➡ Draw a box around them.

2001

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			

➡ Add all the four numbers together.

➡ Divide the answer by four.

➡ Then subtract four from this result.

Discuss what you notice with

your neighbour

➡ Try some other dates.

➡ Try some other months.

➡ Write about what you notice.

e.g. 18 + 19 + 25 + 26 = 88
e.g. 88 ÷ 4 = 22
e.g. 22 – 4 = ?
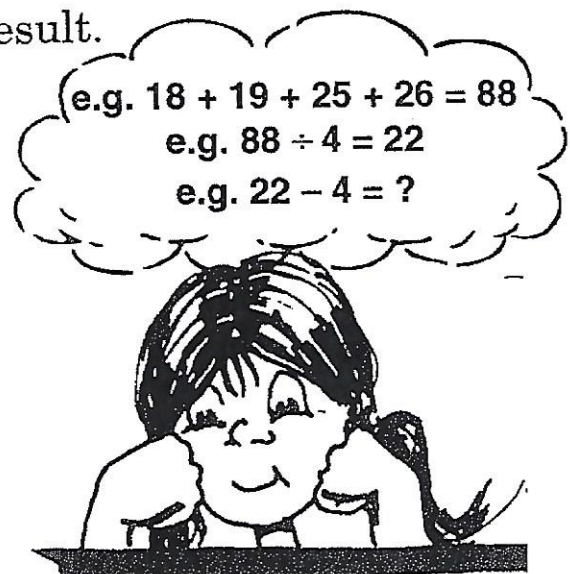
CRAZY CALENDAR
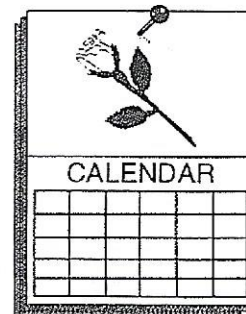
Choose any month from the calendar and draw a
4 x 4 box around any 16 dates.

- Add the numbers in each of the four corners.

  e.g. 3 + 6 + 24 + 27 = 60

- Draw a circle around any number in the box.

- Draw another circle around a different number in the box,
  but make sure it is not in the same row or column as the
  first number.

- Choose another number that is in a different row or
  column to the other circled numbers.

- Choose one more number that is not in the same row or
  column as any of the other circled numbers.

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			

- Add your 4 circled numbers.   **e.g. 4 + 10 + 19 + 27.**

- Compare this total with your total for adding the 4 corner
  numbers.

- Try again using the same set of dates.

- Try using a different set of 16 dates from the same month.

- Try using 16 dates from a different month.

- Write about what you notice.

CASTING OUT NINES

Complete the nine times table.

1 x 9 =	9	6 x 9 = _____
2 x 9 =	18	7 x 9 = _____
3 x 9 =	_____	8 x 9 = _____
4 x 9 =	_____	9 x 9 = _____
5 x 9 =	_____	10 x 9 = _____

Add the two digits in each answer. Write about what you notice.

This fact is the basis of the "casting out nines" method of checking calculations.

If a number is exactly divisible by 9 (i.e. there is no remainder) then its digits should add up to 9.

e.g. 891 is exactly divisible by 9 because
$8 + 9 + 1 \rightarrow 18 \rightarrow 1 + 8 \rightarrow 9$.

687 is not divisible by 9 because
$6 + 8 + 7 \rightarrow 21 \rightarrow 2 + 1 \rightarrow 3$.

Try dividing 9 into 687.

Write down the remainder.

DICE DROPPING

Drop three dice.

| 6 | | 2 | | 4 |

Enter the three digit number produced into a calculator. The order of the numbers is not important.   **624**

Enter the numbers shown on the bottom of the dice in the same order.   **624 153**

Divide the 6 digit number by **37** and then   **16 869**
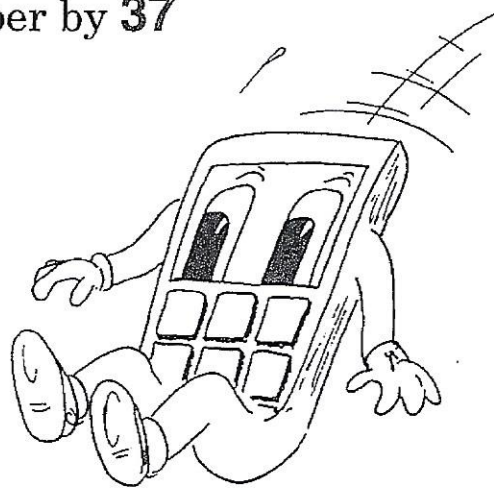
Divide by **3**   **5623**

Subtract **7**   **5616**

Divide by **9**   **???**
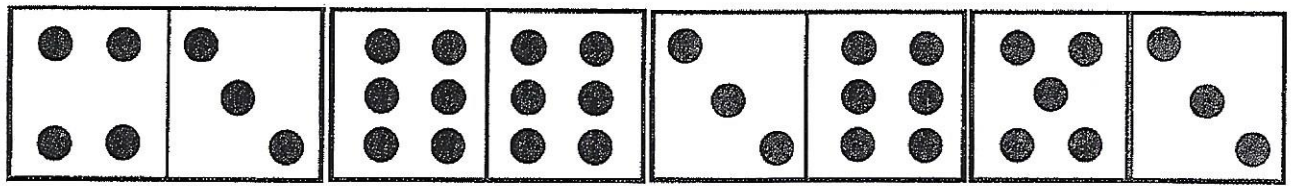
What do you notice about the result?

Try again and note what happens.

Try to explain why it works.

DIABOLIC DOMINOES

- ✈ Ask a student to choose any domino piece, and then follow this procedure.
- ✈ Multiply one of the numbers shown on the domino by **5**.
- ✈ Add **6**.
- ✈ Double your answer.
- ✈ Add the number on the other half of the domino.
- ✈ Ask the student to tell you their final number.
- ✈ Subtract **12** to find the two numbers that were on the original domino.

> One number will be the tens digit and the other number will be the units digit
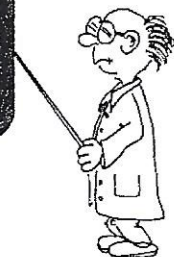
Variations

Use two dice instead of a domino. Make up a different set of instructions.

      e.g. Multiply one of the numbers by **5**.

            Add **7**.

            Double it.

            Add the number shown on the other die.

            Subtract **14** to find the numbers.