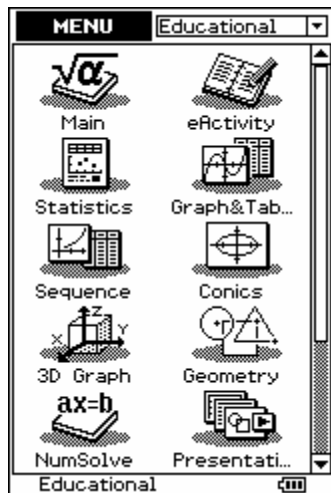
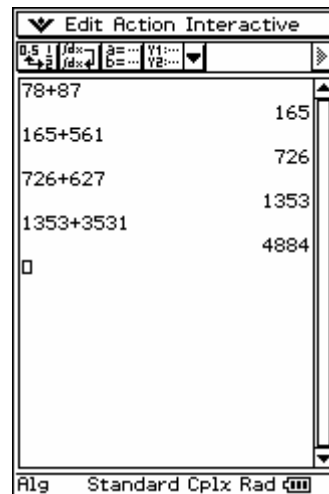


Palindromic Numbers

A number that reads the same sequence of digits from left to right and right to left. Enter into the **Main** icon.



Find out which of these numbers are **0-, 1-, 2-, 3-step** etc palindromic numbers. Use the **ClassPad 300** to help you investigate and complete the palindromic table below:



Examples:

2332 and 1234567654321 are palindromic, as is 4 and 88.

Palindromic numbers can be made from 'ordinary' numbers by revering the number in question and adding the two numbers together, the process repeated until a palindromic number is achieved.

Examples:

- $34 + 34 = 77$ palindromic
- $125 + 521 = 646$ palindromic
- $156 + 651 = 807$
 $807 + 708 = 1515$
 $1515 + 5151 = 6666$ palindromic
- 5 is already palindromic

Example 1 shows that 34 can be 'turned' into a palindromic number in 1 step.

Example 2 shows that 125 can be 'turned' into a palindromic number in 1 step.

Example 3 shows that 156 can be 'turned into a palindromic number in 3 steps.

Example 4 is already palindromic, so it is a 0 step palindromic.

Consider all of the numbers between 0 and 100 inclusive, as shown in the table below:

0	1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18	19
20	2	122	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
100									

Here, 78 is a 4-step palindrome.

		Ones									
		0	1	2	3	4	5	6	7	8	9
Tens	0						0				
	1										
	2										
	3										
	4				1						
	5										
	6										
	7									4	
	8										
	9										
	10										

Do you see any patterns?
e.g. 23 and 32, 59 and 95 etc

If a palindromic number is greater than 10 and has its odd numbered digit positions added together equalling the even digit positions added together is the palindromic number divisible by 11? Does this work in all instances. Can you find a counter-example?

Example:

12345654321

Odd positions $1+3+5+5+3+1=18$ and Even positions $2+4+6+4+2 = 18$
and $12345654321 \div 11 = 1122332211$

Investigate.

Report on your findings regarding palindromic numbers and their divisibility by 11.