14 Grid totals

You will

- form and solve simple linear equations
- use algebra to derive and prove some simple general statements

A Grid totals (answers p 00)

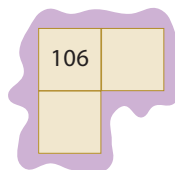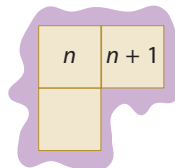**A1** This grid of numbers has ten columns.

An L-shape outlines some numbers.

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

(a) What is the total of the numbers in the L-shape above?

(b) Find totals for the L-shape in different positions on the grid.

(c) Suppose the grid is continued downwards.

    (i) Copy and complete this L-shape for the grid above.

    (ii) What is its total?

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(d) **(i)** Copy and complete this L-shape for the grid above.

    (ii) Find an expression for the total.

n | $n+1$

(e) What numbers are in the L-shape that has a total of 614 on this grid?

(f) Explain why you can't have an L-shape with a total of 154 on this grid.
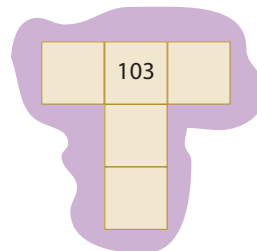
A2 This grid of numbers has ten columns.

A T-shape outlines some numbers.

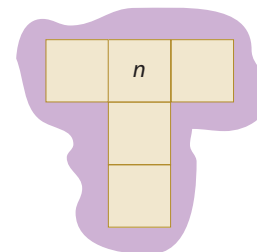**(a)** What is the total of the numbers in this T-shape?

(b) Find totals for the T-shape in different positions on the grid.

1	2	3	4	5	6	7	8	9	10
11	12	1.	14	15	16	17	18	19	20
21	22	23		25	2.	27	28	29	30
31	32	33	3.	35	36	37	38		
4.			44	45	46				

(c) Suppose the grid is continued downwards.

   (i) Copy and complete this T-shape for the grid above.

   (ii) What is its total?

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(d) (i) Copy and complete this T-shape for the grid above.

   (ii) Find an expression for the total.
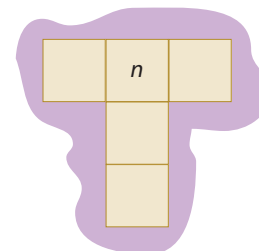
	n	

(e) Draw the T-shape that has a total of 1020 on this grid.

(f) Explain why you can't have a T-shape with a total of 231 on this grid.

A3 Another grid of numbers has six columns.

1	2	3	4	5	6
7	8	9	10	11	12
13	14	15	16	17	18
	20	21	22	23	24
	28				

(a) (i) Copy and complete this T-shape for the six-column grid.

   (ii) Find an expression for the total.

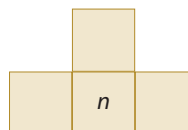|	n	

(b) Investigate T-shape totals for grids with different numbers of columns.

A4 A grid of numbers has twelve columns.

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	

(a) What is the total of the numbers in the shaded shape.

(b) Find totals for this shape in three more different positions on the grid.

(c) Copy and complete this shape for this grid.

(d) Explain why you cannot find a position on this grid for this shape that gives a total of 84.

(e) Show that any total for this shape on this grid must be a multiple of 4.

Test yourself (answers p 00)

T1 Part of a number grid with seven columns is shown below.

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	
	23	24	25	26		
	31					

(a) What is the total of the numbers in the shaded square above?

(b) Find totals for a square this size in two more different positions on the grid.

(c) Copy and complete this square for the grid above.
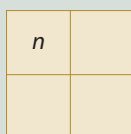
(d) Draw the square that has a total of 200 on this grid.

(e) Explain why you cannot find a position on this grid for a square this size that gives a total of 62.

(f) Show that you cannot find an odd total for any square of this size on this grid.

(g) Can you find a position on this grid for the square that gives a total of 100? Explain your answer carefully.