

The Pied Piper of Hamelin



There is a formula which is however many rats you have, double that number and take it off 300. Your result is how many children there are.

The total number of legs is 600. Each child has 2 legs, each rat has 4. So the total number of legs can be written as:

$$\begin{aligned} \text{Legs} &= \text{Children} \times 2 + \text{Rats} \times 4 \\ \text{Because we know the number of legs, we can write:} \\ 600 &= \text{Children} \times 2 + \text{Rats} \times 4 \end{aligned}$$

Then if we know either children or rats, we can use this to work out the missing one. For example, if there are 100 Children.

$$\begin{aligned} 600 &= 100 \times 2 + \text{Rats} \times 4 \\ 600 &= 200 + \text{Rats} \times 4 \\ 400 &= \text{Rats} \times 4 \\ \text{Rats} &= 100 \end{aligned}$$

$$\text{So Rats} = (\text{Legs} - 2 \times \text{Children}) / 4$$

$$\begin{aligned} \text{If you know legs and rats, to work out children:} \\ \text{Children} &= (\text{Legs} - 4 \times \text{Rats}) / 2 \end{aligned}$$

All of the possible answers are written below!

If you also had spiders (8 legs) then you could work it out using:  
 $\text{Legs} = \text{Children} \times 2 + \text{Rats} \times 4 + \text{Spiders} \times 8$

<u>Children</u>	<u>Rats</u>
300	0
298	1
296	2
294	3
292	4
290	5
288	6
286	7
284	8
282	9
280	10
278	11
276	12
274	13
272	14

270	15
268	16
266	17
264	18
262	19
260	20
258	21
256	22
254	23
252	24
250	25
248	26
246	27
244	28
242	29
240	30
238	31
236	32
234	33
232	34
230	35
228	36
226	37
224	38
222	39
220	40
218	41
216	42
214	43
212	44
210	45
208	46
206	47
204	48

202	49
200	50
198	51
196	52
194	53
192	54
190	55
188	56
186	57
184	58
182	59
180	60
178	61
176	62
174	63
172	64
170	65
168	66
166	67
164	68
162	69
160	70
158	71
156	72
154	73
152	74
150	75
148	76
146	77
144	78
142	79
140	80
138	81
136	82

134	83
132	84
130	85
128	86
126	87
124	88
122	89
120	90
118	91
116	92
114	93
112	94
110	95
108	96
106	97
104	98
102	99
100	100
98	101
96	102
94	103
92	104
90	105
88	106
86	107
84	108
82	109
80	110
78	111
76	112
74	113
72	114
70	115
68	116

66	117
64	118
62	119
60	120
58	121
56	122
54	123
52	124
50	125
48	126
46	127
44	128
42	129
40	130
38	131
36	132
34	133
32	134
30	135
28	136
26	137
24	138
22	139
20	140
18	141
16	142
14	143
12	144
10	145
8	146
6	147
4	148
2	149
0	150